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BISMUTHI ET AMMONIÆ CITRAS.

BY N. GRAY BARTLETT.

A preparation, under the somewhat empirical name of "Liquor Bismuthi (Schacht)," was introduced to the profession, some years since, in England, and more recently it has been the subject of several notices in foreign medical publications.

This liquid contains a bismuthic salt in permanent solution, and is miscible with water without precipitation; its reaction is alkaline, and it possesses but little taste. These desirable properties, in a remedy usually administered in a comparatively insoluble condition, would seem to indicate that this solution had not received undue attention.

It is asserted by the originator, Mr. Schacht, apparently after abundant observation, that a fluidrachm of his preparation, containing one grain of teroxide of bismuth, is equivalent, in medicinal value, to a full dose of the subnitrate of bismuth.

The liquor bismuthi was subjected to analysis by Mr. Tichbourne, who found its constituents to be bismuth, citric acid, and ammonia. (Lond. Pharm. Journ., Jan. 1st, 1864.)

Following the directions of that gentleman, for its preparation, recently precipitated teroxide of bismuth was boiled in a solution of citrate of ammonia; repeated trials proved the oxide to be but sparingly dissolved by this treatment, and demonstrated the impracticability of this process. The alternative me-

thod suggested, that of substituting citrate of bismuth for the oxide, yielded a more satisfactory product.

The writer, having observed the solution of citrate of bismuth, obtained by the addition of ammonia, to have an acid reaction, and also that an excess of that alkali occasioned a precipitate of oxide of bismuth, inferred the existence of a compound salt of bismuth and ammonia; this was subsequently confirmed.

The following formulas, suggested by theory and numerous experiments, were finally adopted:

*Bismuthi Citras.*

Take of

Subcarbonate of Bismuth a troyounce;  
Citrate of Potassa a troyounce and 120 grains;  
Nitric Acid a troyounce and a half;  
Distilled water a sufficient quantity.

Dissolve the subcarbonate of bismuth in the nitric acid, and, when effervescence has ceased, dilute the solution with a fluid-ounce and a half of distilled water, gradually added. Dissolve the citrate of potassa in two pints of distilled water, and to this liquid add slowly, with constant stirring, the acid solution of bismuth.

Permit the mixture to stand for several hours; then pour it on a moistened paper filter, and, when the liquid has nearly ceased to pass, cover the surface of the precipitate with distilled water.

Repeat this operation until the washings no longer contain nitric acid. Allow the magma to drain, and dry it on bibulous paper, with a gentle heat.

*Bismuthi et Ammoniæ Citras.*

Take of

Citrate of Bismuth, in powder, a convenient quantity;  
Stronger Water of Ammonia,  
Distilled Water, each, a sufficient quantity.

Rub the citrate of bismuth with sufficient distilled water to reduce it to a uniform pasty consistence, and add, cautiously, with constant trituration, stronger water of ammonia, until a solution is obtained, observing to avoid an excess of ammonia.

Filter the liquid through paper, returning the first portions that pass, should they be turbid.

Spread the clear solution on glass, that the salt may dry in scales.

*Liquor Bismuthi et Ammoniae Citratis.*

Take of

Citrate of Bismuth and Ammonia 260 grains;

Alcohol two fluidounces;

Distilled water fourteen fluidounces;

Water of Ammonia, a sufficient quantity.

Dissolve the citrate of bismuth and ammonia in the distilled water, neutralize the liquid with water of ammonia, and mix it with the alcohol.

Or, take of

Citrate of Bismuth, recently precipitated, and still moist,  
a convenient quantity;

Water of Ammonia,

Alcohol,

Distilled water, each, a sufficient quantity.

Add gradually to the citrate of bismuth water of ammonia, until the precipitate is dissolved, and a neutral solution is obtained. Dilute this with its volume of distilled water, and filter through paper, returning the first portions of the filtrate, if necessary, until the liquid passes clear.

To half a fluidounce of this solution add hydrosulphate of ammonia in slight excess. Pour the mixture on a tared paper filter, wash the precipitate thoroughly with distilled water, and dry it at a temperature of  $212^{\circ}$ . Weigh the filter and its contents, deducting the weight of the former to obtain that of the tersulphide of bismuth, which, in grains, is to form the third term in a rule-of-three proportion, thus:

$$\begin{array}{r} (\text{Bi S}_3) \quad (\text{Bi O}_3) \\ 261 : 237 :: \end{array}$$

the weight of tersulphide of bismuth to that of teroxide of bismuth in half a fluidounce of the solution.

Apply the same ratio to the remainder of the liquid, and dilute it to such an extent that a grain of teroxide of bismuth will be contained in each fluidrachm of the finished solution;



seven-eighths of which measure must be made up with distilled water, and the remainder with alcohol.

For preparing the citrate of bismuth, the subcarbonate is preferable to the subnitrate, because of its more uniform composition, as well as its greater purity, at least in commercial specimens of these salts. The metal itself is inferior to either, as it is almost invariably contaminated with arsenic.

The bismuth and potassa salts are employed in nearly atomic proportions for the production of a neutral citrate of bismuth; the potassa salt, however, is in slight excess on account of its deliquescent nature. By using solutions considerably diluted, the precipitate is rendered less dense, and the washing, by displacement, is thereby facilitated. This is a tedious part of the process, but the best means of accomplishing the purpose. Washing by decantation is inapplicable, for, before it has been carried to a sufficient extent, a portion of the powder will remain suspended in the liquid, and can only be separated by boiling.

It also entails a greater loss of the citrate of bismuth, which is slightly soluble in water. The absence of nitric acid from the washings can be judged of approximately by the taste, but better by faintly tinging a portion of the liquid with sulphate of indigo, and boiling, in a test tube, for a few minutes; if the color be retained, no nitric acid is present.

In the preparation of citrate of bismuth and ammonia, the citrate of bismuth previously dried is employed, in order that a concentrated solution may be obtained without resort to evaporation, as the heat necessary in this operation occasions a precipitate, caused, apparently, by a loss of ammonia.

The solution should be spread with a brush, on panes of glass, to dry.

Citrate of bismuth and ammonia, as thus prepared, is in the form of brilliant white, semi-translucent scales, not at all deliquescent, but readily soluble in distilled water.

An aqueous solution of this salt, if long kept, like those of the citrates in general, is subject to spontaneous change. The addition of small portions of alcohol and ammonia, as indicated in the formulas for a solution of citrate of bismuth and ammonia, will, it is believed, preserve it indefinitely. The same result

could probably be secured by means of sugar, with the additional advantage of a more agreeable taste.

The composition of the compound salt, determined by direct analysis, is as follows :

$\text{BiO}_3$	=	237	=	50.11 per cent.
$\text{NH}_4\text{O}$	=	26	=	5.50 " "
$\text{C}_{12}\text{H}_5\text{O}_{11}$	=	165	=	34.88 " "
$5\text{HO}$	=	45	=	9.51 " "

---

$\text{Bi O}_3, \text{NH}_4\text{O}, \text{Ci} + 5 \text{HO} = 473$  100.

The bismuth contained in the washings can be recovered by neutralizing them with ammonia, and treating with sulphuretted hydrogen. The precipitated tersulphide of bismuth, after having been washed and dried, may be reduced to the metallic state, or converted into the subcarbonate by suitable means.

The writer is unable to state any facts in relation to the therapeutical properties of citrate of bismuth and ammonia. Owing to its solubility, it would undoubtedly be more perfectly diffused over the mucous surfaces, or more readily absorbed into the system, than the ordinary salts of bismuth.

Accepting the evidence of Mr. Schacht as conclusive, the dose of this salt would be two grains, or of the solution, a fluidrachm.

Chicago, Illinois, November, 1864.

#### A FLY-LEAF TO MY "ASSAY OF ALKALOIDS."

To the Editor of the American Journal of Pharmacy :

MY DEAR SIR,—The notice which appeared in your last issue of a paper read before the British Pharmaceutical Conference at Bath, by Mr. Thomas B. Groves, of Weymouth, England, as a matter of course requires a few words on my part. When I read it, and before the appearance of the complete paper in the November number of the *Pharmaceutical Journal*, I wrote to you that I did not intend to answer until I should be ready to give the results of my progress within the year past. But the manner and spirit in which that paper is conceived and in which it was received by the meeting at Bath,

obliges me to alter my intention, and to reply beforehand to an attack which is alike unsound and unfair.

The paper of Mr. Groves, it seems, was called out by a self-constituted query of his, "On the Assay of Alkaloids in Pharmaceutical Extracts." In it the author proposes to give a general review of the different processes that have at various times been proposed for the purpose, and to sum up his experience as to which is the best for general adoption. His researches have extended to as many as three modes of conducting an assay, and to two abortive propositions. The three first named are all founded on the precipitation of alkaloids by iodohydrargyrate of potassium, for which I published before all others a systematic procedure in the volume of Transactions of the American Pharmaceutical Association for 1862. Instead of a proposal to substitute something better for this method of mine, Mr. Groves converts by far the greater part of his pages into an effort to bring my statements into discredit, and so far carried away the judgment of his hearers at Bath as to receive permission to print this paper.

First in order, there is a general assertion on the part of Mr. Groves that the iodohydrargyrate of the alkaloids obtained by the reagent, which I directed in 1862, ought to have the formula: Alkaloid + HI + 2HgI, that is, an equivalent of the hydriodate of the alkaloid with two equivalents of iodide of mercury. In consequence, those of my assays in which I employ respectively 1 or 3 or 4 or 6 equivalents of mercury for precipitation are incorrect. Besides, I am charged with having established as a general formula that of: Alkaloid + HI + one HgI.

As I shall investigate Mr. G.'s formulæ at another point, I will here only dispose of this matter so far as my own are concerned. The fact is that, with the exception of the one for opium, I have published detailed assays only for atropia, strychnia, and brucia, and in each of these my results are exactly those required by Groves' formula, viz.: Alkaloid + HI + 2HgI. The two last quoted assays were read before the Baltimore Meeting of the American Pharmaceutical Association in 1863, (Proceed. 1863, p. 251), dated a whole year before my critic's paper, and of the same month in which my assay of opium



appeared in this Journal. I there distinctly compare their composition with that of Hinterberger's double chlorides of the same alkaloids, which probably present the only analogy in that class of compounds. As to atropia, I have never written such a formula as Mr. Groves pretends to copy from me. It is evidently deduced from the formula for morphia of September, 1863, while my assay of atropia was written in December, 1862, and appeared in your January number of 1863.

The truth is, that in the paper last quoted I did not publish any formula whatever; but what Mr. Groves alludes to is a line in the first part treating on alkaloids generally, where I use the following words: "*The compounds formed are the hydriodates of the bases with iodide of mercury.*" I was not indebted to Mr. Groves for this information; it was my own view of their constitution, which was strengthened by that of Boedecker's compound of nicotia. But it would be strange if Mr. Groves could not tell what caused me to give expression to this phrase. Must I recall that in his first paper (published on page 97 of Vol. xi. of the *Journal of the Chemical Society*), his formula was not what it is now, but *alkaloid + sesqui-iodide of mercury*, viz.,  $\text{Alk.} + \text{Hg}_2\text{I}_3$ ? Well was it then for me to state that they are the *hydriodates* of the bases with iodide of mercury, and I did so at the time, not in the least acquainted with the able manner in which Mr. J. Dyson Perrins had previously handled Mr. Groves' assumptions in the later pages of the *Pharmaceutical Journal*, (Vol. xiii. pp. 241 and 340.)

I come next to a personal matter, which I believe will now be understood in its true light.

My critic attacks my mode of assaying the residual liquid with silver, and (in italics) throws out the suggestion that, in my assay of atropia, I have been guilty of recording a falsehood. I grant that if any chemist, whether personally acquainted with me or not, can be made to believe of me, to what the argument leads, that after stating at the head of the paragraph the exact quantity of reagent required, I could have used *four times* that quantity, and having found that I had done so in one experiment, could have been guilty of doing the same over and over again,—then I stand convicted. Bent upon discovering errors, he reads residuary silver for combined halogens, and,—here is

the laughable side of this incident,—in attempting to bring into discredit my assay of atropia by controverting its results, he entirely overlooks the fact that in so doing he also upsets one of his own formulæ, that of atropia +  $\text{HI} + 2\text{HgI}$ . I have never used any other for it.

In my original paper I recommended measuring in the liquid portion of the mixture holding the precipitate, the excess of iodine and chlorine by a solution of silver, and without filtering. The latter is quite practicable in the case of atropia and some bases where the precipitates form a resinous mass, but is not generally applicable, and was withdrawn by me in my paper on opium. Mr. Groves falls foul of this non-filtration, but admits that there are a few exceptions in which it may be done, and that I had myself directed filtration; yet he omits to state that *atropia is one of his cases of exception*.

Something, I am sure, altogether unheard of in reviewing a method in chemistry, and especially a volumetric process, is that the critic does not in the least pretend to work with the same solutions as the original author, but uses liquids of a degree of dilution which he imagines better adapted for the purpose. Now, whether this be so or not, there are certain alkaloids which show variations according to dilution similar to those produced in Bunsen's iodine-assay, according to whether different solutions of sulphurous acid are employed. My equivalents of iodohydrargyrate are all taken with a tenth normal liquid against one percentum of alkaloid in solution. I also gave a grain or troy-test liquid of one-fifth the strength of my metrical solution. But in the paper on opium I stated that owing to the solubility of the precipitate with morphia, the former troy-liquid was too weak to give accurate results, and that one of five times the strength was to be used, that is, of the same strength as the metrical solution. For the assay of strychnia and brucia, however, I retained the original weak solution as sufficiently accurate for pharmaceutical purposes.

My solutions of alkaloid contain either one-half or one per cent., at least, in those cases where I have published detailed researches. In these I never use less than 10 cubic centimeters, about 225 drops, but in most cases 20, 30, or 40 c. c., repeatedly and in succession.

Mr. Groves' alkaloids vary with the equivalent between one, and four-tenths of one per cent., and the quantities with which he has compared and by which he would subvert my numbers are one hundred grains of these liquids, a large sized teaspoonful. These, morphia and all others, he compares with a test liquor of exactly the strength of my original (1.5th) troy solution.

As a consequence, wherever I have prescribed dilute solutions in both cases, as less than one-half per centum of strychnia, and allow, as in this instance, the weak mercuric solution, the numbers agree well enough to receive Mr. Groves' approbation. But mark the difference in the case of morphia :

Mr. Groves supposes, according to his theory, that	Of his test liquor.
he requires	100 grains.
He actually requires	70 “
Reduced to his numbers, my metrical solution is consumed to the extent of	75 $\frac{3}{4}$ “
Reduced to his numbers, my strong troy solution with Groves' solution of morphia is consumed to the extent of	78 “
My theory requires	75 “

The strength of the solution of morphia, I have stated in my assay of opium, should be such that after precipitation with the reagent the whole bulk of precipitate and liquid when diluted for filtering and testing with silver may represent not less than 0.3 gramme of morphia in 100 c. c. ; that is, 1 c.c. is equal to the filtrate from 0.003 gramme of morphia after precipitation ; the space of 0.3 c. c., supposed to be occupied in the 100 c.c. by the dry precipitate, is not counted. This is almost precisely the dilution of Mr. Groves' original solution (=0.303 grain in 100). The difference between the two modes of assaying then is, that he measures a dilute solution with a test liquor of one-fifth the strength of mine, while I have assayed with mercury a more concentrated solution (1 p. c.), and after reducing the liquid to the strength of the original one of Mr. Groves, measure it again with silver. If any cause for error may arise, dilution for instance, it is existing in his solution from the beginning, in mine only after removal of the precipitate ; and while the former is constantly growing weaker by the addition of test-

liquor, by filtering and washing,—the latter, together with all test-liquids and washings added, only reaches the strength of Groves' original solution at the last.

He does not perceive this, but impresses upon his hearers the belief that I continue to dilute the liquid indefinitely. "But when strong solutions are used the precipitate is either clotty or gelatinous, and not to be washed without much water, thus reproducing the difficulty sought to be avoided."

Mr. Groves' logical conclusions sometimes differ from mine, as in this paragraph on morphia.

His theory requires that equal parts of both liquids should be consumed, but his reaction stops at 70, not at 100. Hydro-sulphate of ammonia indicates mercury in solution, and after (or before?) adding more iodohydrargyrate, strychnia likewise gives a precipitate. Hence he concludes that there is already an excess of iodohydrargyrate. So that out of 70 parts of test-liquor, which contain about one and a half equivalents of mercury, he has actually extracted his two equivalents and over. He is bound to contradict the evidence of his senses, because they seem to confirm my view; nor does he stop to inquire and to decide by the simplest test possible what causes the precipitate to re-dissolve. His "series of experiments showed the cause of this to be the ready solubility of iodohydrargyrate of morphia in iodide of potassium. It is also soluble in *hot* water." I stated more than a year ago that this compound of morphia was unusually soluble in water, meaning, of course, water of the ordinary temperature, and was therefore not surprised that *on evaporating the filtrate to one-third, the whole of the precipitate held in solution separated in perfect order.* Would it have separated if the iodide of potassium had been its solvent?

There remains, in fact, no doubt but that my original proportion of 3 mercury to 2 morphia correctly expresses the proportion of test-liquor required for this alkaloid. And no experiments of mine have as yet been able to induce me to depart from the proportion in which I have combined the ingredients, and thus to destroy the uniformity of the method.

As here, so elsewhere, the composition and quantity of the precipitate are not always expressed by the equivalents of test-



liquid for a given quantity of alkaloid, but by a definite fraction of that equivalent.

As proof of this I will give some analyses by other chemists, while the main question shall be proved by Mr. Groves' testimony.

Bœdecker (*Ann. Chem. Pharm.* lxxiii. p. 372; *Gmelin*, vol. xiv. 228) describes a compound of iodide of mercury with hydriodate of nicotia of the formula,  $\text{Nic}^+ \cdot 2\text{HI} + 2\text{HgI}$ . This is the composition of the precipitate formed by four equivalents of mercury, but crystallized from excess of hydriodic acid.

Wertheim (*Journal f. pr. Chem.* vol. 91, p. 481—*Chem. Centralblatt*, 1864, p. 791), gives the preparation of another iodo-hydrargyrate of nicotia of the formula— $\text{Nic}^+ + \text{HI} + 2\text{HgI}$ , obtained by boiling an alcoholic solution of  $\text{Nic}^+ \text{HI}$ , with a large excess of mercuric oxyd. The same chemist, in the same paper, describes a third compound, without hydriodic acid, produced by treating a mixture of mercuric iodide in nicotia with boiling water; this has a composition according to  $\text{Nic}^+ + 2 \text{HgI}$ .

Which of these formulæ has Mr. Groves found by analysis? He unhesitatingly adopts the second, while in his volumetric assay he had to use almost exactly the quantity of mercury which my assay requires, i. e., four equivalents. What then has become of the two equivalents of mercury?

Now, one of the very first points upon which Mr. Groves differs with me is this excess of mercury in solution, of which, in my paper of December 10th, 1862, I spoke in the main as follows: "In the reactions between some of the alkaloids and the iodohydrargyrate of potassium (the solution of one  $\text{HgCl}$  in  $3\text{KI}$ ) the mercury partly remains in solution. For this reason not a solution of iodide of mercury must be used, inasmuch as with a solution of the latter the results very much differ; nor must the solution of alkaloid be added to the mercuric solution, but the latter to the former." This, I presume, shows that even then I was aware of several causes of ambiguity, and that in order to secure uniformity in the results, I desired to use but one test liquid and one mode of proceeding.

Mr. Groves, on the other hand, concludes that my mode of

assaying alkaloids cannot be correct because of this statement. As support for this belief of his, he gives no experiment nor proof whatever, but his individual opinion, that "he could not see any reason why any mercury should necessarily remain in solution unless an excess of iodohydrargyrate had been added, or the resulting alkaline compound was to some extent soluble, (meaning as such)." "Whether," he continues, "we have compounds of one equivalent of Alk. HI, and one or more eq. of HgI, an equation can be formed to meet the case, leaving no uncombined mercury in solution."

For the purpose of proving this against him it is necessary to introduce the record of his assay with quinia and cinchonia.

I. *Quinia* requires, according to

Mr. Groves' theory.	His results show,	My results are,	My theory requires.
$\text{Chi} + \text{HI} + 2\text{HgI}$			$2\text{Chi} + 3\text{HI} + 6\text{HgI}$
100.	140 and over.	148 to 151.	150 grains.

His experiments, it seems, were made at night, at the seasonable hour of 9 P. M. "After 130 grain measures had been added the filtrate reacted still with iodohydrargyrate, (N. B., because there was still some quinia in solution), but not with quinia, (N. B., because there was not then any mercury in excess); but with 140 it reacted decidedly with both reagents; at 9.30 P. M., half an hour after, the same liquid reacted decidedly with quinia, but scarcely perceptibly with iodohydrargyrate." This last deportment is what proved a stumbling block to Mr. Groves' perception, and he concludes not only that my numbers are incorrect, but also that the alkaloid-compound itself passes into solution.

My own observation of what passes at the end of this reaction differs, probably because it was made in day-light. The reagent, which in my hands is always five times as strong, when added to the amount of  $5\frac{1}{2}$  eq. of mercury produces a canary-colored, flocculent precipitate, which settles very rapidly and leaves a cloudy liquid above it; when this is now filtered on a watch-glass, every drop of fresh test liquor will produce a white, crystalline precipitate, which continues exactly up to the point of saturation, i. e., of 6 equivalents of mercury. This is still better observed at the end in the glass vessel containing the

whole mixture. If, after the reaction on the watch-glass becomes indistinct, the glass beaker is shaken for one minute, the mixture will settle almost clear, and upon now adding drop for drop more of the reagent, it sinks to the bottom and at once forms a dense cloud over the stratum of precipitate, if any quinia be left in solution. Whenever the cloud no longer makes its appearance, the numbers consumed, with the usual deduction for surplus, will represent 6 equivalents of mercury. In the meantime the color of the precipitate will have changed to white.

My view of the cause for this retardation is, that 2 eq. of quinia require 6 eq. of mercury for complete precipitation; that when a considerable excess of KI has accumulated, it will tend to re-dissolve a portion of HgI, and destroy the yellow color; and that this is the cause why a fresh solution of quinia or any other alkaloid will then produce a precipitate; while in the dilute mixture the action of the now very much diluted alkaloid on the mercury is overpowered by the solubility of the latter in the great excess of KI; but that when a fresh quantity of mercury is added, held in solution by a small excess of KI only, this will in part rescue the re-dissolved mercury and then act on the remaining alkaloid, similar to a solution of nitrate of silver that will precipitate all the silver from a solution in cyanide of potassium, but is itself involved in the precipitation.

In fact, the filtrate shows the presence of mercury if none whatever is added in excess, but not a trace of quinia. I think nothing remains but to conclude that the mercury in solution will have to be deducted from the formula of the alkaloid-precipitate, which originally was  $2\text{Chi} + 3\text{HI} + 6\text{HgI}$ , and became  $2\text{Chi} + 3\text{HI} + 5\text{HgI}$ , or was changed in some similar manner.

How closely my reasoning coincides with what actually occurs is shown by Mr. Groves himself. The formula for the quinia compound, which he published in 1858 and confirms in this paper, is  $\text{Chi} + \text{HI} + 2\text{HgI}$ . As will be seen, the result of his analysis does not agree with the formula; but to admit that the formula was incorrect would upset his theory of the precipitate.

So we have:

Mr. Groves' Formula.		My Formula.	
$\text{Chi}^+ + \text{HI} + 2\text{HgI}$		$2\text{Chi}^+ + 3\text{HI} + 5\text{HgI}$	
Quinia	324	2 quinia	648
HI	128	3 HI	384
2 HgI	454	5 HgI	1135
<hr/>		<hr/>	
906		2167	

The formulæ require, in 100 parts,

	Groves' formula.	His analysis.	My formula.
Quinia (+H)	35.88	30.40	30.05
Iodine	42.05	46.52	46.88
Mercury	22.07	23.03	23.07
	<hr/>	<hr/>	<hr/>
	100.00	100.00	100.00

This simply means that Mr. Groves' analysis establishes my theory.

It would be wrong to leave the impression as if he entirely approved of his results; but the very singular conclusion that he arrives at is, that all other chemists are mistaken in the matter of the equivalents of the cinchona-alkaloids. He suggests that they be revised, and raises the further question, "whether or not the rectification of equivalents may be extended to other alkaloids less known than the cinchona series." This paragraph I must take for an acknowledgment on his part that there really are other precipitates which do not agree with his theory!

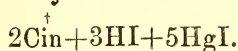
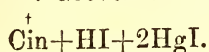
What has been said in regard to the quinia salt refers equally to that of cinchonina. I must here remark that, with a carelessness quite peculiar, in recording experiments, if not in conducting them, he allows us to suppose that 100 grains of the quinia solution in one case required 140, and in another 230 grain measures of test liquid; for, although it must be supposed that in the latter case he used twice the quantity of alkaloid, he never alludes to it, but allows the reader to draw his own conclusions from the glaring discrepancy in the results; and he continues this precisely in the same manner in his assay of cinchonina.



## II. Cinchonia.

Mr. Groves' formula

My formula.



Cinchonia 313.

2 Cinchonia 626.

HI 128.

3 HI 384.

2 HgI 454.

5 HgI 1135.

895.

2145.

In 100 parts:

By his formula.

His analysis.

My formula.

Cinchonia (+H) 35.09. 28.56.

29.47.

Iodine 42.57. 47.45.

47.22.

Mercury 22.34. 23.99.

23.31.

100.00 100.00

100.00

His assay, altogether owing to dilution, differs from mine as 190 to 156.

I cannot conclude this paper without some words about Mr. Groves' strictures with reference to my method in analysing extracts. As I have never pretended to determine the separate quantity of alkaloids until I had really eliminated them, and since I have never analysed a juice or extract without previously acidulating it, I cannot perceive the drift of some of them. There is one instance in which he apparently contradicts a statement of mine about the precipitation of albumen by my reagent. I said two years ago that the precipitation is not interfered with by the usual constituents of pharmaceutical preparations, except alcohol and acetic acid, and that not even albumen caused a disturbance. I had previously ascertained that a strong solution of this substance remained perfectly clear upon the addition of iodohydrargyrate of potassium, and that its precipitate by corrosive sublimate was redissolved by iodide of potassium. I may now add that under ordinary circumstances no precipitation of albumen is caused by the reagent in watery solutions of extracts, unless they contain a very large excess of mineral acid. All such minute quantities of albumen are likewise precipitated by chloride of mercury, and there is no ob-

jection to their previous removal by this means. The precipitate from iodohydrargyrate at once disappears when the acid is neutralised, that with corrosive sublimate turns yellow with the alkali.

In place of the various proposals for the separation of alkaloids from vegetables and preparations with which we have been favored, I can recommend the process of which I have given an outline in my paper on tobacco, read before the last meeting of the American Pharmaceutical Association at Cincinnati. It is apparently still capable of improvement, but in an assay will answer all the purposes of the delicate method of Stas.

The process is founded on one of Heinrich Rose's suggestions in his paper on the decomposition of iodide of mercury. By adding a clear solution or a mixture of protochloride of tin in caustic alkali to the precipitate, all mercury is at once precipitated in the metallic state, and if the mixture be now shaken with ether, all that is soluble in this menstruum is taken up. When the solution from which the original mercuric precipitate has been obtained was impure and of a dark color, it is better at once to redissolve the alkaline mixture without the ether, in sulphuric acid, and to determine the alkaloid *de novo* in the filtrate. If the alkaloid be insoluble in ether, the alkaline mixture is thickened with bi-carbonate of soda in large excess, and then treated with alcohol; the solution in the latter is freed from iodides by an aqueous and acidulated solution of acetate of lead.

I could have wished that after all this labor I might say that Mr. Groves had left behind in this memorial something which we could consider an addition to our knowledge of the matter he had taken in hand. It is easy enough to tear down or injure a structure; but whoever lends a hand in this, should also be prepared with material for the new building.

As it is, surely my assay has borne no damage from the encounter,—at least I hope that you, Mr. Editor, and your readers, will judge so.

I remain yours truly,

FERDINAND F. MAYER.

College of Pharmacy, New York, December 5th, 1864.

## NOTE ON CHLORODYNE.

BY CHARLES BULLOCK.

[Some time ago the late Dr. Franklin Bache presented us with a blue vial of "chlorodyne as introduced by Dr. J. Collis Browne," &c., &c., "manufactured by J. T. Davenport, 33 Great Russell St., Bloomsbury, London," which had been sent to him. The vial had a glass stopper, and was tied over with skin. Mr. Bullock being engaged in an attempt to produce "chlorodyne" by the recipe published in the *Chemist and Druggist*, Feb. 15th, 1860, the above specimen was submitted to him for comparison with his product. In justice it should be said that the vial had never been opened, but gave indications of not being so tight as to prevent loss of hydrocyanic acid, yet it was too nearly full to admit of much waste of chloroform. The following note from Mr. B. gives the result of his examination.—ED. AM. JOUR. PHARM.]

*Philadelphia, Nov. 9, 1864.*

WM. PROCTER, JR. :—

I herewith return the bottle of chlorodyne, and am much obliged for the opportunity of inspecting "Davenport's original," as introduced by Dr. J. Collis Browne, Army Medical Staff."

What is chlorodyne? Those who have attempted to put together the supposed ingredients after the instructions of Dr. Ogden, (Vide Am. Jour. Pharm., vol. xxxii. pp. 181 and 334,) have doubtless found that the pharmacist "was not at home" when the recipe was devised.

Perchlorate of morphia is almost entirely insoluble in chloroform, and the addition of the other ingredients mentioned in the recipe will not cause the morphia to be retained in solution. The amount of chloroform directed is evidently much in excess of what is contained in Davenport's chlorodyne.

A portion of chlorodyne was agitated with absolute alcohol, and the alcohol decanted from the viscid residue, insoluble in this menstruum.

The alcoholic solution, when mixed with water, occasioned but a faint cloudiness, indicating that oily or resinous substances were present only in minute quantities.

A solution of nitrate of silver, added to the alcohol, rendered it slightly turbid; a few drops of ammonia made the solution clear again. Hydrocyanic acid was thus shown to be absent in this specimen. After dilution with water, carb. of soda did not affect the alcoholic solution.

Another portion of the alcohol was evaporated in a watch-glass; a small portion of viscid matter was left, having a pungent, peppery taste.

The matter insoluble in alcohol appeared to be glucose. It dissolved readily in water. A drop of sulphuric acid was added, and the solution filtered. A few green streaks were left on the filter, resembling chlorophylle. To the solution carbonate of soda was added in slight excess, which caused a flocculent matter to separate; this was collected, and found to re-dissolve readily in water acidulated with acetic acid. A dilute solution of potassa again precipitated it. The precipitate, agitated with an excess of potassa, dissolved but sparingly; the clear solution again afforded a precipitate on being neutralized with acetic acid. This reaction would indicate the presence of morphia, though the appearance of the precipitate, when examined under a glass, was not recognized as the usual form of this alkaloid. That portion insoluble in potassa was again dissolved in dilute acetic acid; to the slightly acid solution carbonate of soda was added in excess. After standing an hour or two the solution remained clear. On heating it sufficiently to expel the free carbonic acid present, the solution became turbid, and deposited a flocculent matter, which, under a glass of 60 diameters, appeared amorphous, was sparingly soluble in spirits of wine, and infusible, charring when heated.

Of the alkaloids from opium, codeia behaves with reagents somewhat similar, viz., not precipitated from weak acid solutions by alkaline carbonates immediately, and not precipitated from its solutions by ammonia. The alkaloids strychnia, brucia, and veratria are soluble in a solution containing free carbonic acid. The absence of the first was indicated by the want of its characteristic bitterness, and the last two by insolubility in alcoholic menstrua.

Having encroached as far on the contents of the bottle as I felt free to do, I have not determined to my own satisfaction the character of the alkaloids present in chlorodyne, and hope that some of the correspondents of this Journal will give us more information concerning this nostrum.

About two-thirds of chlorodyne appears to be treacle; the remaining one-third chloroform, a small amount of water, in



which the alkaloids are previously dissolved, a little peppermint, and capsicum,—and perhaps some cannabis indica.

The following recipe will furnish a preparation having the pharmaceutical properties of chlorodyne, according to Dr. Ogden :

R

Muriate of morphia,	grs. viii.
Water,	fl. ʒss.
Perchloric acid (25° B.)	gtt. xx.
Chloroform,	fl. ʒjss.
Tinct. of Indian hemp,	fl. ʒj.
Hydrocyanic acid (U.S.P.)	gtt. xii.
Molasses,	fl. ʒss.
Oil of peppermint,	gtt. ij.
Oleoresin of capsicum,	gtt. i.

To the morphia and water in a small flask add the perchloric acid, and heat until a clear solution is obtained. Then add the molasses, previously warmed to render it fluid. Heat the mixture, and agitate well. When cold, add the other ingredients, and mix thoroughly.

## MANUFACTURE OF PERCHLORIC ACID.

BY CHARLES BULLOCK.

Having occasion to prepare perchloric acid in some quantity, the process of M. Deville for obtaining fluosilicic acid was tried as a preliminary step.

The process of M. Deville consists in passing steam through a mixture of fluorspar and silica heated to redness. The water is decomposed with the production of hydrofluoric acid, which takes up silica, and fluosilicic acid distills over.

In the first experiment, an iron retort was used, and in place of passing steam through the mixed ingredients, water was allowed to drop slowly on the hot materials through a safety tube. A small amount of weak acid was obtained, after which water distilled over. In the second experiment, the tube for introducing water was carried to the bottom of an iron retort. After a small amount of very weak acid had distilled over, the distillation ceased. An examination of the retort showed that the

iron tube passing through the materials in the retort, as also the retort, had fused. The iron had evidently melted below its usual fusing point, owing to the fluorspar acting as a flux.

Another experiment was made with an earthen retort of half a gallon capacity. A porcelain tube was passed through the tubulure of the retort to within an inch of the bottom. Fluorspar and silica, broken into fragments of the size of large peas, were introduced into the retort, which was placed in a wind furnace, and a suitable condensing apparatus connected. When the retort had reached a full red heat, steam was introduced from a steam boiler, by means of suitable connection. For a short time the process promised well, then ceased.

An examination of the contents of the cold retort showed that the hot silica had been disintegrated by the steam sufficiently to pack the mass too tight for the vapor to penetrate it.

With this experience, I resorted to the process I had before employed for perchloric acid, which, although it claims no novelty, may interest some readers of the Journal from its details.

The first step, to obtain perchlorate of potash, is as follows: Heat in a porcelain crucible of 8 oz. capacity, over a gas furnace, eight ounces of chlorate of potash, until the salt is in complete fusion, taking care that but little or no oxygen is evolved. Then cover the crucible, and continue the same amount of heat till the fused salt thickens and crusts entirely over on top. A portion of the salt removed from the crucible should now impart but a light yellow color to pure undiluted muriatic acid. The crucible is now removed, and allowed to cool. When cold, the fused mass detaches itself completely from the crucible by turning it upside down.

Dissolve the mass in  $2\frac{1}{2}$  pints of boiling water. The perchlorate of potash crystallizes out on cooling, and should be washed with water to separate the mother water.

The loss of weight by heating the chlorate of potash was about two ounces in each pound. Amount of perchlorate of potash obtained from a pound of chlorate, about eight ounces. Four hours' heating was required for eight ounces of chlorate of potash, the gas flowing through a six foot burner, to about three-fourths of its capacity.

Perchlorate of potash is the most insoluble of all the salts of

perchloric acid, requiring 65 times its weight of water, at 60° F., for solution.

To obtain perchloric acid from perchlorate of potash, the salt is distilled (below the boiling heat of the ingredients) with twice its weight of sulphuric acid mixed with one-tenth part of water, as long as any distillate is obtained. The distillate, containing perchloric and sulphuric acids, together with some free chlorine, and a little hydrochloric acid, is treated with carbonate of lead rubbed into a paste with water, till baryta water no longer disturbs the clear solution. Should an excess of carbonate of lead have been used, the perchlorate of lead is to be carefully decomposed by sulphuric acid. The weak acid is now filtered from the sulphate and chloride of lead, and a few drops of hydrosulphuric acid added, to decompose the slightly soluble chloride of lead. After boiling, the acid is again filtered, and may now be concentrated in an open capsule below boiling until it attains a specific gravity of 1.6, or thereabouts, when it commences to give off white vapors. By distillation of this product an acid having the density of 1.693 is obtained.

One pound of perchlorate of potash yielded five ounces of acid of a density of 1.210.

The properties of perchloric acid have been so fully described by Prof. Roscoe, (vol. xxxiv. p. 64 of this Journal), that further notice is unnecessary.

The effect of this acid, sp. gr. 1.693, was tried on the following articles with morphia, codeia, narcotina, and atropia; no reaction. With

Meconin,	flesh color.
Quinia,	pale straw color.
Strychnia,	pale yellow.
Brucia,	rose color.
Delphia,	a dirty red color.
Aconitia,	a light ochry yellow.
Digitalin,	snuff brown.

#### *Perchlorate of Morphia.*

Dr. Ogden, in his analysis of chlorodyne, claims perchlorate of morphia as one of its ingredients. The following short no-

tice of this salt are the results of some experiments made to ascertain its character. It crystallizes in long acicular prisms. Requires 73 parts of water, and 44 of alcohol, at 60° F., for solution. In chloroform it is almost entirely insoluble.

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## NOTE OF CORRECTION ON PERMANGANATE OF POTASSA.

BY EDWARD R. SQUIBB, M. D., OF BROOKLYN, N. Y.

In the experiments, upon which a paper on Permanganate of Potassa, in the September number of this Journal, was based, an important practical error occurred, which should have been earlier corrected.

The direction given in that paper to recrystallize the product first obtained was soon found to be not only unnecessary, but injudicious and wasteful, and it is the object of this note to correct this mistaken direction.

The "accumulated crystals in the funnel," if deposited from a clear solution, are, when carefully washed by percolation with distilled water, sufficiently pure for all ordinary purposes, though they do contain a very small proportion of free potassa. The writer now believes that Permanganate of Potassa cannot exist in hot solution under ordinary circumstances, without the presence of a definite, though small, proportion of free potassa. After the free potassa has all, or nearly all, been separated, a portion of the salt is decomposed into hydrated binoxide of manganese and free potassa, until the latter is again in sufficient amount to protect the remainder from decomposition. It thus happens that in attempting to recrystallize the well washed crystals, as directed in the published paper above referred to, great loss is unnecessarily occasioned. The formula and process may be very successfully carried out as published, if, to the six pints of boiling distilled water used to dissolve the washed crystals, half an ounce of solid caustic potassa be added, and the product will be exceedingly pure and nice. But for all ordinary uses the recrystallization may be entirely dispensed with, provided the process be well managed. A proportion of caustic potassa beyond that now indicated would, however, be very objectionable, as it would render the salt irritant and often hurtful.



It is questionable whether the excitant and stimulant action of the salt in its therapeutic uses be not due, in part at least, to the small proportion of free potassa always present or formed in the solution.

*Brooklyn, December 16, 1864.*

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#### ON A TEST FOR THE RESIN OF CANNABIS INDICA.

BY WILLIAM PROCTER, JR.

Having accepted the question, "Is there a reliable test for the active resin of *Cannabis sativa* of the East Indies, whereby the genuineness of 'Extract of Indian Hemp' may be satisfactorily and easily ascertained by the pharmacist?" the following paper is offered as a reply.

It need hardly be said that extract of Indian Hemp is a valuable medicine in the opinion of many practitioners, when prepared from hemp tops that have had their virtues developed by growth in a favorable climate and soil. In East Indian commerce there are three substances derived from the hemp plant, viz.: *gunjah*, consisting of the flowers and incipient fruit, with the smaller branches; *bang* made up of the leaves and capsules without the stalks; and *churrus*, the resinous matter secreted by the hemp plant under favorable circumstances. These have been long known in the East, but the form in which it has been chiefly employed by European and American practitioners, is the alcoholic extract of *gunjah*. The variableness in the medicinal power of this extract has been the cause of much disappointment to physicians; for whilst some samples prove effective in half-grain doses, *ten* or even *twenty* grains of other specimens have failed to produce its peculiar influence on the nervous system. The extract of commerce varies in consistence and color. Its green hue is sometimes much darker than at others, and its odor is equally variable in strength. Although professedly an alcoholic extract, much of it is but partially soluble in alcohol of 90 per cent. In a sample of extract, that had been imported several years ago from Mr. Squire, of London, in bulk, as much as 40 per cent. of the preparation was insoluble in stronger alcohol. The undissolved portion was brown, and readily soluble in water.

In another sample from the same House in ounce jars, the proportion of aqueous extractive was hardly noticeable. Another sample, the origin of which was not known, and which was quite old, had a solid consistence, almost black color, and produced powerful effects at the time it was tried therapeutically many years ago. No feature of this extract is more marked than its softness. After a pretty thorough examination of the subject, I believe this to be chiefly due to *fixed oil* of the hemp seeds, which the tops often contain sufficiently developed to yield oil, and which is, to a greater or less extent, extracted by the spirit, and being miscible with the resin, they remain in close union.

As regards the extractive matter soluble in water, its presence is easily accounted for, either by the use of alcohol weaker than .835, or by following strong alcohol with weaker spirit to displace the former, when the process is carried too far. When officinal alcohol alone is used, it may occur by continuing the boiling process until the percentage of alcohol gets below the standard strength, as will occur with officinal alcohol during continued digestion. Where the proportion of matter insoluble in alcohol is as great as 40 per cent., either error or design must have produced it, as under no ordinary circumstances will hemp yield to alcohol such a product.

In the process of Mr. Robertson, of Calcutta, described by Pereira, in which the vapor of alcohol boiling in a still is conducted into the top of a cask containing the gunjah, with an ordinary condensing worm attached to the bottom of the cask, this may also readily occur; as the last portions of vapor from the still will be much more watery than the first, they will dissolve the extractive and carry it down into the recipient along with the resin, to be mingled with it in the subsequent concentration to the extractive consistence.

M. Gastinel, of Cairo, Egypt, has suggested that the resin should be washed with water to rid it of this extractive.

M. Laneau, of Brussels, after finding that hemp resin is much more soluble in a mixture of alcohol and ether or chloroform than in alcohol alone, recommends the hemp to be exhausted by percolation with such a mixture, which not only dissolves the resin better, but does not dissolve the inert matter.

Messrs. T. and H. Smith, of Edinburgh, who have studied hemp resin closely, have preferred to treat the gunjah first with water, and then with solution of carbonate of soda, to remove inert matter soluble in these menstrua, after which the hemp is dried and exhausted with alcohol. The tincture is then treated with milk of lime and filtered, and the dissolved lime separated by sulphuric acid. This treatment by lime is probably intended to remove fixed oil, and any other resinous matter than the active one, should any be present. The tincture is then decolorized by passing it through animal charcoal, evaporated to a syrupy consistence, and precipitated by water and dried. This process produces the pure hemp resin, but is far too tedious to pursue with the extract, which, if wholly soluble in alcohol of 90 per cent., is sufficiently freed from the inert matter of the gunjah. To obtain the answer to the query, it became necessary to secure an authentic specimen of hemp extract, which was obtained directly from gunjah of good quality.

One thousand grains of gunjah were reduced to powder, with the exception of the stalks, moistened with half an ounce of alcohol pressed in a funnel, the stalks thrown on the top, and the whole slowly percolated with alcohol of .817 sp. gr. until eight fluidounces of the tincture had passed; the process was then stopped, and the tincture reduced to an extract by careful evaporation.

The product was soft, of a dark, dull green color, had the peculiar odor of hemp resin well marked, and weighed 110 grains, equal to 9 per cent.

It had the following properties:—

Soluble without appreciable residue, in strong *alcohol*, *ether* and *chloroform*. *Benzole* dissolved all but a small residue of blackish green matter, which is wholly soluble in alcohol; and on the evaporation of the benzolic solution, the resin retained its odor and other sensible properties.

*Oil of turpentine* dissolved it quite readily, and the solution, on standing, became coated with minute scaly crystals, the nature of which was not determined.

*Olive oil* dissolved it completely, forming a greenish solution, which has been suggested for pharmaceutical use by Laneau and by Githens.

*Sulphuric acid* acts slowly on the resin in the cold, more rapidly hot, without intumescence, and when diluted with water, a greyish precipitate falls.

*Nitric acid*, sp. gr. 1.38, when cold, slowly attacks the extract, but when heated, rapid reaction occurs, red fumes are evolved, and the resin is converted into an orange red resinoid substance, about as abundant as the resin treated. This, when washed with water and dried, has the appearance of minute fragments of gamboge, which it closely resembles in color.

This substance is readily soluble in alcohol, ether and chloroform, and does not crystallize from these solutions on evaporation; it is also soluble in solutions of potassa and ammonia and methylic alcohol, but is insoluble in benzole and acetic acid, and appears to possess an acid reaction with litmus.

*Liquor potassæ* acts but slightly on this extract, apparently removing little besides matter soluble in water, and, perhaps, fatty oil when present, and a part of the green coloring matter.

Of these reactions those best calculated to indicate true hemp resin extract, are:—

1st. Its odor when moderately heated.

2d. Its indifference to alkalies.

3d. Its solubility in alcohol, ether, chloroform, benzole and turpentine; and

4th. The reaction of nitric acid, which is the best marked test.

Before trying other resins it was deemed best to procure some American grown hemp, and make an extract from it with the same menstruum. Fortunately that this was easily accomplished, and the tops only of vigorous specimens of the cannabis were selected, dried and powdered. The color was deep grass green, the odor rank, but different from gunjah. Three hundred grains were reduced to powder, and treated with the same alcohol in like proportion as in the preceding experiment, and a soft extract, weighing thirty-seven grains, was obtained.

The color of this extract was a brighter green, and its odor quite different from the extract of gunjah; it rubbed down readily with liquor potassæ, making a dark colored liquid, not all in solution. When treated with hot nitric acid, rapid effervescence of nitric oxide followed, leaving a yellowish



liquid with a very small proportion of orange-colored resinoid matter, which appeared to be the same as that from Indian hemp.

It is very clear, from these results that the extract of common hemp may be easily detected by its solubility in caustic alkali, and the small portion of resinoid it yields by nitric acid.

1. The extract of Indian hemp before alluded to as being 40 per cent. of resin, was tried by these tests, and the resinous matter found to correspond with that made from gunjah.

2. Squire's extract in ounce jars afforded a large proportion of resin, which reacted with nitric acid like that obtained from gunjah.

3. A sample from my cabinet, fifteen years old, nearly dry, in dark greenish-black masses. This, when acted on by nitric acid, did not lose its greenish color, and altogether behaved differently from that made from gunjah.

4. Guaiac resin, treated with nitric acid, first became blue,—afterwards yellowish brown, but yielded no yellow resinoid.

5. Common resin yielded a yellowish resinous product by nitric acid, but entirely different from that obtained from hemp resin; in fact none of the resins tried have afforded a product similar to that from Indian hemp.

Whatever merit there may be in this test, it must be made more manifest by further experiments, with a series of extracts of known origin and therapeutic powers, so that it may be seen whether the results of testing are parallel with medicinal power: and the attention of members is invited to the subject, that they may, from samples tried by the physicians of their several neighborhoods, apply these tests, and ascertain their real value or accuracy.—From *Proc. Amer. Pharm. Assoc.*, 1864.

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#### GLEANINGS FROM FOREIGN JOURNALS.

BY PROF. F. F. MAYER.

*On Chelidonic Acid.*—C. Wilde (*Annalen der Chemie u. Pharm.*, Band cxxvii., page 164, August, 1863,) has examined the silver salt of this acid, and the action of heat and of bromine on the acid itself.

Chelidonate of silver has a composition expressed by the

formula  $C_{14}H_3AgO_{12}+2HO$ . It forms by a molecular change in the crystals of the basic salt, which is obtained by precipitating the salt of an alkali with nitrate of silver, and recrystallizing from a solution in dilute nitric acid. The tri-basic salts of this acid, which form on treating those containing two equivalents of the base with an alkali, possess a yellow color.

The acid crystallizes with 3 eq. of water for every two of acid. It effloresces in the air, and loses the whole of its water of crystallization over oil of vitriol or at  $212^{\circ}$  F. Heated to  $292^{\circ}$  F., it again loses water; at  $428^{\circ}$  F., it turns greyish and gradually still darker, and fuses with much frothing (from the escape of over 40 per cent. of carbonic acid) to a black mass, and a crystalline sublimate fusible at  $136^{\circ}$  F. The black residue contains an acid nearly corresponding to the formula  $C_{30}H_{14}O_{28}$ , which is soluble in water, but insoluble in alcohol.

Strong sulphuric acid destroys chelidonic acid on application of heat; the other mineral acids do not appear to act on it. Treated with excess of bromine in the presence of water at a moderate heat, decomposition, without evolution of gas, takes place. Hydrobromic acid is formed, a heavy oil remains in the retort, and another oil, heavier than water, passes over with the vapors of water. The residuary oil crystallizes in colorless radiating crystals from an ethereal solution; these have the composition of *pentabrom acetone*,  $C_6HBr_5O_2$ , from which it differs only by its fusing point being much higher, and its greater resistance to the action of heat. The residuary liquid likewise contains *oxalic acid*. The heavy liquid which passes over appears to be *bromoform*.

*An apparatus for the fractional distillation of bituminous coals, shale and mineral oils, etc.*, has been contrived by Regnault for the use of the French Customs and manufacturers, and is described in *Annales de Chimie et de Physique*, Tome 68, p. 409, and Fresenius' *Zeitschrift fur Analytische Chemie*, 1864, p. 357. Here it is used by the rectifiers of petroleum, and is for sale by Luhme & Co. in New York.

The apparatus consists of a small upright cylindrical copper still, with a tubulus on top for the introduction of the oil, and for the insertion of a cork with a thermometer for determining the boiling point. The beak is a narrow tube soldered to the

side below the tubulus, and fits into an adapter-tube attached to an upright cylindrical condenser made of brass, which ends both above and below into a narrow tube, the latter to carry off the condensed products, the other as a safety-tube. The condenser is enclosed in a brass or tin cooler with supply and overflow pipe for water, to which it is fastened by the descending and the adapter tube, which pass through the cooler. The whole is supported by a tripod bearing the cooler, attached to which is also a holder for the lamp. The tripod also carries below a horizontal shelf, on which a tube-stand moves in a slide, there being five tubes marked each for 100 cubic centimetres; these are intended to receive the various quantities of oil, which distil over at or between certain boiling points. The retort is not to be charged to more than one-third its capacity; the bulb of the thermometer must not be allowed to dip into the oil, but its scale below the mark of 80° C. must not be visible above the cork.

This contrivance may be made to answer some purposes in a pharmaceutical or technical laboratory besides the one for which it was originally intended.

*Sublimation of Alkaloids.*—Dr. Helwig, of Mayence, has published (in Fresenius' *Zeitschrift*, 1864, p. 43) researches on microscopic tests applicable for diagnosis, and among these describes the *sublimation* of nearly all medicinal alkaloids, which he states, when properly treated, furnished perfect objects for micro-chemical examination. The alkaloids in the form of fine powder, are heated very carefully on a piece of platinum foil, hollowed out somewhat, and covered with a plain glass plate.

Most of the sublimates are stated to be crystalline; those of morphia and strychnia are obtained with especial facility, and allow the application of all the usual tests. They are readily distinguished by a dilute solution of chromic acid, which forms crystals with strychnia, but not with morphia. Brucia does not yield so readily a crystalline sublimate, nor is the reaction with chromic acid as distinct. Veratria, solania and aconitia also give crystalline sublimates; the product in the latter case is perfectly soluble in ammonia, from which solution it again crystallizes on evaporation. Atropia is very easily destroyed when too high a degree of heat is employed; when carefully



treated a sublimate is obtained, consisting of clear, colorless drops, which form crystals with the acids. Digitalin likewise yields such a product, the nature of which could not be ascertained as satisfactorily, though it appeared to form crystals with some of the acids.

*Comparative value of Narcotic Extracts and Alkaloids.*—We extract some portions from a paper read early in 1863, by Alois Jandous, before the General Society of Austrian Apothecaries. The author refers to the varying statements made by different writers, and often by one and the same, in regard to the quantities of alkaloids contained in the extracts of which they are assumed to be the active ingredients: Thus, while Rabourdin quotes an extract belladonnæ with .53; and another with .05 per cent. of atropia, Mein gives the yield of pure atropia from the leaves as .02, and Procter that of the root as .33.\*

This statement of Rabourdin probably refers to crystallizable atropia, since it must be assumed that extract of good quality was employed, which, as regards activity, ought to surpass the leaves or root. The only cause necessary to adduce for such discrepancy is the facility with which this and other alkaloids of the Solanaceæ, and other organic compounds, are decomposed in contact with moisture, air and heat; for atropia, when left standing but a short time under, or dissolved in water, ceases to be crystallizable. From 0.1 gramme of crystallized atropia which had been precipitated by tannin, after decomposition of the precipitate with oxyd of lead and extraction with alcohol, but .056 grm. were recovered, and that in the amorphous condition. An extract of belladonna, which had been prepared a year before from the coagulated juice, yielding  $2\frac{1}{2}$  per cent.,

\*[Brandes gives 1.51 per cent. of malate of atropia in the leaves. As by the Prussian method of preparing the extract of belladonna from fresh leaves, viz: treatment of the inspissated juice with strong alcohol, the yield is from  $3\frac{1}{2}$  to 4 per cent. of extract, this latter, adopting the lowest statement, that of Mein, should contain at least 6 per cent. of atropia. Mayer, of Heilbronn, obtained  $1\frac{1}{4}$  per cent. of pure alkaloid from extract, or  $\frac{1}{3}$  per cent. from the dried root. Geiger estimates 200 grains of extract equal to one grain; Schroff the same quantity, equal to 7 grains. The best American alcoholic extract (U. S. P., 1860) yielded from 2 to 3 per cent. of impure atropia, of which not one-third was crystallizable.]

was treated with ether, alcohol and caustic lime and gave 3.8 per cent. of a brown, amorphous mass, which again yielded a precipitate of tannate corresponding to 1.9 per cent. of atropia. The same extract, by comparing it approximately with a solution of the pure sulphate, previously tested with one of biniodide of potassium, showed that it ought to have contained 5 per cent. of atropia. It appears, however, more probable that the quantity of the alkaloid should be assumed as 2, or rather 3, per cent., the precipitation by tannin being not perfect. Of an extract of this strength the maximum dose of 2 grains then corresponds to .16 grain of atropia.

Hyoscyamia, which is described as a crystalline substance, the author was unable to obtain in any other form than that of volatile oily fluid, having a strong odor of tobacco. From a soft extract, prepared from the fresh flowering herb, which had yielded 2.6 per cent., ether and potassa, extracted only 0.46 per cent. of this oily base. An alcoholic extract, made from the same herb, of which it had produced only  $\frac{3}{4}$  per cent., after treatment with subacetate of lead, sulphuretted hydrogen, caustic lime and ether, yielded a still more impure product. The greater percentage of hyoscyamia in the latter extract, which should have been 3 or 4 times that of the former, must have been destroyed by the process of eliminating it.

Extract conii, which was a yield of 3.9 per cent. from the flowering herb, gave 3 per cent. of pure conia. It should be noticed that the alcohol recovered from the evaporation of alcoholic extracts contains perceptible traces of volatile alkaloid.

*The Raphides or Crystals in certain Vegetable Drugs.*—Prof. Berg, as well as Flückiger, some time ago declared the crystals found in abundance in South American soap bark to be those of gypsum. Blekrode and Martius afterwards stated that they were carbonate of lime (arragonite); but Kindt lately showed that they contained no sulphur, but were soluble in hydrochloric acid, and no doubt consisted simply of oxalate of lime, a fact which Flückiger now confirms, (*Schweiz. Wochenschr. zeitung. N. D. Apoth. Verrin.*, March 31, 1863.) On examining the crystals found in the bark of guaiac, which Guibourt had declared to be benzoic acid and Berg as another occurrence of gypsum, Flückiger discovered them to be the ordinary oxalate

of lime, with probably a trace of the sulphate of an alkali. The same appears to have been observed by Scheele. Guaiac wood and its bark show besides a remarkable difference in the respective quantities of ashes which they yield; the splint or colorless part left .916 per cent. of ashes; the central, dark-colored and resinous wood only .6 per cent. The bark of quassia, which is likewise rich in oxalate of lime, leaves 17.84 per cent., the wood only 3.68 per cent. of ashes. The crystals contained in tamarinds Flückiger declares to be those of *tartrate of lime*. The latter salt is likewise present to a considerable extent in the quillaya bark; the ashes of the latter contain traces of lithium, and probably rubidium.

Oxalate of lime, either in the form of acicular, prismatic, or rhomboidal crystals, is contained also in *Cort. Swieteniae Senegal*, *Cort. Strychnos*, *N. Vom.*, *Pareiræ*, *Colombæ*, *Hippocastani*, *Pruni Padi*, *Cedrelæ*, *Scillæ*, *Colchici*, *Veratri [albi (?)]*, *Chinæ*, *Sarsaparillæ*, *Polygonati*, *Paridis*, *Iridis Flor.*, *Belladonnæ*, *Geoffroyæ*, *Simarubæ*, *Lopez*, *Cascarillæ*, *Cinchonæ*; also, in *Rad. Rhei* and other *Polygonaceæ*, *Saponariæ*, *Convolvuli*, *Orizab.*, *Cort. Granat.* *Rad. trifructus*, *Rad. Ipecacuanhæ*, *Rubiæ*, *Ipomoeæ Mechoacanæ*, but not in the officinal tubers from *Exogonium Purga*. Benth.

*Test for Tartar Emetic.*—As such C. Claus (*Pharm. Zeitschrift f. Russland*, No. 12. *Schweizer Wochenschrift f. Pharm.* 1863, p. 135) recommends the solution of perchloride of iron, which produces a peculiar reaction with not too strongly acid solutions of tartar emetic, as a test, that serves to distinguish it quite readily from all other officinal preparations of antimony. The solution of iron added to a concentrated solution of the tartar emetic merely gives it a yellow tinge, but when the solution is largely diluted with water there forms at once a yellow precipitate of the color of chromate of lead. In a very dilute solution a single drop of the iron liquor produces at once this precipitate, which, what must be carefully observed, is readily soluble in an excess of the reagent. If less than sufficient of the latter is added to redissolve the precipitate, it assumes a gelatinous consistence. It is principally oxychloride of antimony colored by iron, and contains a little tartrate of antimony and potassa, which cannot be removed by washing.

## RESEARCHES ON THE RESPIRATION OF FLOWERS:

BY M. AUG. CAHOURS.

While the green portions of plants under the influence of light effect the decomposition of carbonic acid, of which they assimilate the carbon, rejecting the oxygen into the atmosphere, the colored parts, on the contrary, consume the oxygen to produce carbonic acid. Thus, by one of nature's most admirable harmonies, the atmosphere does not, after ages, become sensibly modified.

But if experiment has long since proved that flowers left in atmospheric air develop carbonic acid at the expense of the oxygen it contains, it is, nevertheless, interesting to determine the modifications presented by this phenomenon under varying circumstances.

Now, do all flowers of equal weight, or of equal surface consume, under identical circumstances, the same quantity of oxygen, and produce the same proportion of carbonic acid? Do scented flowers behave in the same way as those which are scentless? Does the same flower act more energetically on an atmosphere determined under the influence of a more or less vivid light than in perfect darkness? Is the consumption of oxygen proportionate to the temperature of the medium in which the flower respire? Does a plant consume the same quantity of oxygen at each period of its development? Finally, what do the various parts of the plant—the calyx, corolla, pistil, stamens—respectively play?

Such are the questions I propose to resolve.

If we experiment on various flowers of equal weight, arrived at the same state of development, it is easy to ascertain, by operating under perfectly identical conditions, that the respective consumption of oxygen in a given time is far from being the same. As to the more or less powerful odor exhaled by the plant, it seems to play but a trifling part in the production of this phenomenon; in fact, a scentless, or nearly scentless, flower consumes, in a given time, more oxygen than a strongly scented one. Results obtained at the beginning of these researches led me at first to suppose that scented flowers



absorbed atmospheric oxygen more rapidly ; but later and multiplied experiments on various flowers have shown me that this view could not be established as a general conclusion.

On the other hand, I am convinced that, other things being equal, though the proportion of carbonic acid formed is generally rather greater when the flower is exposed to the light than when it is in perfect darkness, the difference is far from being so great as is supposed. This difference becomes much more manifest when the normal air is replaced by pure oxygen.

When the phenomenon takes place in ordinary air, it is not unusual to find that the results are the same, whether obtained in darkness or in a bright light. This result is very different to those obtained with most organic substances, which, enclosed in equal weights in tubes containing equal volumes of atmospheric air, consume much more oxygen in light than in darkness. The differences observable under these circumstances may probably be accounted for, in the one case, by the bodies undergoing change being possessed of more or less energetic vitality, and in the other being entirely inert.

In operating on the same plant, either in complete darkness or in the light, it is found that as the temperature is raised, the proportion of carbonic acid produced in a given time is very appreciably augmented. This result is observable in the most various flowers. When the outer temperature varies from  $+15$  to  $+25^{\circ}$ , the transformation of oxygen into carbonic acid is rapid ; but with temperatures between  $+5$  and  $+10^{\circ}$ , it is, on the contrary, slow.

The plant does not consume the same quantity of oxygen at different periods of its development, nor produce the same proportion of carbonic acid. Such is the result of a large number of comparative experiments. The differences are, nevertheless, not very considerable. By gathering from the same plant exactly equal weights of buds and full-blown flowers, and placing them respectively in equal volumes of normal air under identical conditions of light and temperature, the consumption of oxygen is almost always slightly greater with the buds than with the full-blown flowers,—a result which is not surprising when we consider that the vital force is greater in the first than in the second instance ; still, the difference is never very striking.



Now, all plants being composed of several distinct parts, it may be asked, "What part is taken by each portion in the production of the phenomenon?" To ascertain this, it is necessary to anatomize the flower—to isolate its various parts, to study the part each plays—by putting them respectively in contact with known volumes of normal air—taking their respective weights into consideration—and comparing the results given by the various parts, with the general results derived from the entire plant, the experiment being, moreover, effected under perfectly identical circumstances.

By operating thus on flowers with sufficiently developed pistil and stamens, the weight of which is not a fraction too small for that of the entire flower and the corolla, such as the oriental poppy, the field coquelicot, the coquelicot with large bracts, the lily, the water lily, &c., I found that on comparing the proportion of carbonic acid furnished by the corolla with that given, under the same conditions, by the pistil and stamens, there was a great difference in favor of the latter—a result which might, indeed, have been expected.

Finally, independently of the carbonic acid formed by the combustion of the elements of the flower at the expense of atmospheric oxygen, this gas itself disengages a certain proportion, as may be ascertained by leaving the flowers in an apparatus containing inert gases, such as hydrogen or nitrogen.

In conclusion, I summarize thus:—

1. That all flowers left in a limited atmosphere of normal air consume oxygen, and produce carbonic acid in proportions varying as the flower is scentless or not.
2. That the circumstances under which the phenomenon takes place being identical, the proportion of carbonic acid increases as the temperature is raised.
3. That generally with flowers from the same plant and of equal weight, the quantity of carbonic acid produced is rather greater when the apparatus in which the experiment is performed is exposed to the light, than when it is in darkness; that the proportion is, nevertheless, sometimes the same under either condition.
4. That when the normal air is replaced by pure oxygen, the differences become much more marked.

5. That buds produce rather more carbonic acid than fully-developed flowers, which is explicable by the greater vitality of the buds.

6. That flowers left in inert gas disengage small quantities of carbonic acid.

7. Finally, the pistil and stamens, which possess the greatest vitality of any part of the flower, consume the greatest quantity of oxygen, and produce the largest proportion of carbonic acid.—*London Chemical News*, No. 251, from *Comptes Rendus*, lviii. 1206, 64.

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## ON PYROXYLIN.

BY MM. PELOUZE AND MAUREY.

The attempts made during the last twenty years to substitute gun-cotton for ordinary powder for fire-arms and mines have resulted in most opposite conclusions. In France, after numerous experiments, it has been discarded on account of its detrimental effect on the metal of fire-arms and accidents from spontaneous combustion and explosion, first brought into notice by a memoir presented by us to the Institute in 1849.

In Austria, General Lenk has continued to occupy himself with the manufacture and use of this explosive material. He prepares it by a process which has been followed on a large scale at Hirtenberg, and which remained for some years a profound secret. But during the last year, papers on this subject have been published by German chemists and by General Lenk himself.

It would appear from these papers that the Hirtenberg pyroxylin does not decompose spontaneously, like that made in France at the Bouchet powder factory, and, moreover, differs from the latter in its composition, and in the circumstance that its explosive power may be regulated by particular arrangements. We will now examine the value of these assertions, giving the results of some experiments and analysis we have made with the co-operation of MM. Faucher and Chapoteaut.

*Processes followed at Hirtenberg and at Bouchet.*—The pyroxylin made at Hirtenberg by General Lenk's process, is like

the Bouchet pyroxylin, the product of the immersion of cotton in a mixture of monohydrated nitric acid and sulphuric acid at 66°. The two methods, however, differ in several respects.

Thus, the proportions of the two acids are not exactly the same, Lenk's mixture being composed of one part of nitric acid to three of sulphuric acid; that of Bouchet, under the name of unequal volumes, is prepared with one part of the first of these acids and two of the second, equivalent in weight to 1 per 2.46. The above-mentioned memoir gives as being most successful a mixture of three volumes of nitric acid and seven of sulphuric acid (by weight 1 to 2.86), proportions very nearly those given by General Lenk.

At Hirtenberg the cotton is steeped in portions of 100 grammes in 30 kilogrammes of the mixture. It is withdrawn from the bath after being shaken in it for an instant, and each time the quantity of mixture absorbed by the cotton is replaced by a fresh amount. These operations are continued indefinitely, the weight of the mixture being always 300 times that of the cotton.

When the desired quantity of cotton has been steeped, it is put into a receiver and allowed to remain forty-eight hours impregnated by the acids. It is then placed in a strainer, where most of the uncombined acids are expelled in a few minutes.

It is freed from the remainder in a stream of water in which it is washed, and where it remains immersed for six weeks, when it is strained a second time, boiled for two or three minutes in a solution of carbonate of potash of 2° Baumé. After a third and last straining the cotton is dried in the air if the weather is favorable; if not, in a stove of which the temperature is not allowed to exceed 20° C.

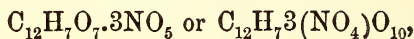
General Lenk has latterly made use of a solution of soluble glass of 12° Baumé. The cotton prepared as above is soaked in it, dried, and exposed to the air for a sufficient time to allow the carbonic acid of the atmosphere to combine with the soda of the glass, which determines the precipitation of an insoluble silicate, which, according to General Lenk, "encloses the fibres of the cotton, and prevents the development of gases."

At Bouchet the cotton is steeped in vessels containing only 2 litres of mixture for 200 grammes of cotton, and the steeping is considered complete at the end of an hour.

About 70 per cent. of non-combined acids are pressed out, the cotton being then watched for one or two hours in the river, freed from most of the water by strong pressure, and left for twenty-four hours in an alkaline ley to neutralise the last traces of acids. Withdrawn from this, it is a second time washed in the river, then pressed, and finally dried on a light canvas, through which a ventilator forces cold air.

Soluble glass has not been tried at Bouchet, but we are about to show that it is not so beneficial as it is supposed to be by General Lenk.

*Quantity of Pyroxylin produced by a given quantity of Cellulose.*—A German report signed by MM. Redtenbacher, Schrotter, and Schneider gives to Lenk's pyroxylin the formula—

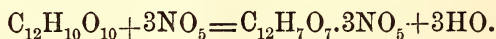


equivalent to the following composition :—

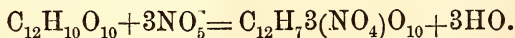
Carbon	.	.	.	.	.	24.24
Hydrogen	.	.	.	.	.	2.36
Oxygen	.	.	.	.	.	59.26
Nitrogen	.	.	.	.	.	14.14
						<hr/>
						100.00

The reaction may be explained in two ways :—

1. By admitting that by contact with the mixture of nitric and sulphuric acids the cotton loses the water, which is replaced by the first of these acids—



2. By supposing that the hydrogen of the cellulose is replaced by an equal number of equivalents of hyponitric acid—



According to this 100 parts of cotton ought to produce 183 of pyroxylin; but though in more than 100 experiments we have varied the proportions of the bodies producing this explo-



sive matter, 178 is the greatest yield we have been able to obtain.

The German report is silent on the subject of the yield, which, in our opinion, constitutes the most solid basis for determining the composition of pyroxylin. We do not say that the exact determination of the yield of cotton in pyroxylin renders useless the elementary analysis of the latter, but it is necessary that the analysis should agree with the figures representing this yield.

Our experiments on the yields have been made with cotton of good quality, previously washed in a boiling solution of carbonate of potash or soap, and then freed as much as possible from foreign bodies, particularly from cotton seeds. Before being used it was carefully dried in a Gay-Lussac stove, between 100° and 115°.

The sulphuric acid marked 66° on the Baumé areometer. The nitric acid had a density of 1.500 at 9°; it was yellow and slightly nitrous.

The relative proportions of the sulphuric and nitric acids were varied so as to present—1. The composition of Lenk's mixture; 2. That of the unequal volumes of Bouchet; 3. Various intermediary proportions between 2 and 3 of sulphuric acid for 1 of nitric acid.

The relative proportions of acid mixture and the weight of cotton were also varied, including those formerly used at Bouchet, and those indicated by General Lenk, until the weight of the acids was 500 times that of the cotton.

The duration of the immersion of the cotton in the acids varied from 1 to 66 hours.

In all these experiments the yields differed very little, never exceeding 178 per cent. of cotton.

The yield in manufactories whether at Hirtenberg or Bouchet is far from being so large as that obtained with small quantities in the laboratory. In fact, General Lenk says that it requires 64.500 kils. of undried cotton to produce 100 kilogrammes of pyroxylin, which corresponds to a yield of 155. Supposing the cotton to contain 6 to 7 per cent of moisture, the yield of dry cotton at Hirtenberg would have been from 165 to 167 per cent.



The yield at Bouchet, after the working had become regular, was 165.25 per cent.

Though unable to draw from these numbers any conclusion as to the theory of the formation of pyroxylon, we cannot pass over in silence a circumstance as important as the yield, so as to speak identical with it, obtained on a large scale in the two factories.

(To be continued)

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### PRELIMINARY NOTICE OF A NEW EARTH.

By M. CH. BISCHOF.

In treating a calcareous mineral by the ordinary re-agents, M. Ch. Bischof has discovered an earthy substance which, by its chemical properties, appears to differ from all the other known earths. The following are the different characters assigned to it by the author:

The new earth is precipitated by sulphide of ammonium; it is more completely precipitated by potash than by ammonia. The precipitate is bluish white, gelatinous, and dissolves sensibly in water. An addition of tartaric acid does not prevent it forming. It is almost completely soluble in carbonate of ammonia. This solution is precipitated by oxalic acid. When this precipitate is intimately mixed with carbon, and the mixture heated in a current of dry chlorine, the chloride of the new base is seen to volatilise; the sublimate obtained is more volatile than chloride of iron. But what characterises more particularly this substance is the manner its chloride comports itself at a high temperature. Heated strongly, the salt splits into a portion which sublimes in form of a white deposit, and a portion which remains and which presents the characters of a base.

The blowpipe and spectroscope failed to give any decisive reactions. The volatility of the chloride, and the solubility of the oxide in water have prevented M. Ch. Bischof obtaining a large quantity of the earth in question, but he promises a further communication.—*Chem. News*, October 22, 1864, from *Cosmos*, October, 1864.

## REPORT ON THE PURITY OF SULPHATE OF QUININE OF COMMERCE.

BY MR. W. WALTER STODDART.

*(Read at the Bath Meeting of the British Pharmaceutical Conference, September, 1864.)*

Probably quinine is one of the most important therapeutic remedies for the ills of the human body that has ever been introduced to the notice of the medical man; so extensively is it used, and with such certainty may its effects be calculated, that no other substance can be advantageously substituted. Yet this very circumstance unfortunately gives the temptation for frauds and adulterations so commonly said to be practised by unprincipled dealers.

The smallness of the dose with which quinine gives such remarkable results, renders any sophistication all the more dangerous, and disappointing to the physician; indeed, the very turning-point of an illness may be frequently dependent on the purity of a sample of quinine.

It is not by any means to be supposed that any suspicion is attached to the high respectability and probity of the well-known manufacturers of quinine. Existing adulterations, properly so called, such as the deliberate addition of salicine, sugar, boracic acid, quinidine, cinchonine, etc., are only made by second or third-rate dealers, or when it has passed through the hands of a third or fourth party. Such samples may still be found in shops situated in secluded parts of the country or lowest streets of a city, and traceable to the same origin.

On the other hand, probably from difference in the mode of preparation or separation of the cinchona alkaloids, quinine differs much from the presence of its isomeride quinidine. The latter is often, if not always associated with quinine in the natural state, and has many of its reactions exactly similar, besides being nearly as soluble in the usual menstrua.

It therefore becomes to a certain extent a natural mixture, and in proportion to the completeness of the extracting process, so will be the purity of the product. Opinions, it is true, vary greatly as to whether quinine and quinidine differ in their medicinal power, and therefore some may say that the presence of

the latter (quinidine) is of no consequence; this, however, is not the question at issue, and the points of this report are strictly confined to the commercial purity of quinine and its freedom from the cheaper salts.

In carrying out this object the desired results are three-fold:—

First, *Qualitative*, or to find an easy and reliable test for the presence of the three most common cinchona alkaloids, quinine, quinidine, and cinchonine:

Secondly, *Quantitative*, to find the most practical and reliable mode of separating and estimating these alkaloids; and

Thirdly, an application of the above to the examination of the sulphate of quinine as made by the principal manufactures.

Although the cinchona barks contain many alkaloids, only four occur in sufficient frequency and quantity to merit notice in a commercial investigation—quinine, quinidine, cinchonine, and cinchonidine. In actual practice the two last may be estimated together.

The most prominent impurity in quinine is quinidine; in none of the after-mentioned samples was cinchonine discovered in any quantity except one. The slight solubility of the cinchonine salts as compared with those of quinine and quinidine, and the boldness of its crystallization would, to the practiced eye, soon lead to its detection; experiments will easily show the truth of this, and that quinidine and not cinchonine must be generally sought as the chief impurity in commercial sulphate of quinine.

Notwithstanding tests for the purity of quinine are so numerous and in some instances so trustworthy, still few apply to the *separation of quinidine* from quinine; nearly all are proposed for the indication of quinine only, or its detection when mixed with other substances.

The polariscope tests of Bouchardat and Pasteur, and the fluorescent test of Professor Stokes, require too much study and practice to come into general use for qualitative analysis among manufacturers and retailers.

The same remarks apply to the exquisitely beautiful experiments of Dr. W. B. Herapath. It is quite true that to the expert the iodide test will detect the presence of a very minute portion

of quinine, quinidine, or cinchonidine, yet it requires considerable experience with an expensive polarizing microscope, with great consumption of time, to give good results, when only a minute quantity is operated on.

The chlorine and ammonia test of Brande, and the chlorine test of Pelletier, will not distinguish always between quinine and quinidine.

The presence of so much water and ammonia is detrimental to the British Pharmacopœia test, which is anything but a good modification of Liebig's original one.

From these remarks it will be apparent that a good qualitative test for detecting the several cinchona alkaloids in an unknown mixture is a desideratum. From a considerable series of experiments it appears that these conditions may be amply fulfilled by either of the two following methods :

The first is a modification of that proposed by Liebig.

Into a glass tube or bottle put ten grains of the suspected salt, dissolve in ten minims of dilute sulphuric acid and 60 minims of distilled water; to this add 150 minims of *pure* sulphuric ether, three minims of alcohol, and 40 minims of a solution of hydrate of soda (1 part to 12 parts). Agitate well and lay aside for 12 hours, when, if the slightest trace of quinidine, cinchonine, or cinchonidine be present, they will be seen at the line of separation between the ether and solution of sulphate of soda.

If only a small percentage of quinidine be present, it will appear as an oily substratum, appearing under the lens as dust from the minuteness of its particles. Cinchonine will appear more decidedly crystalline. With a little practice, the eye will easily distinguish which of the alkaloids is deposited.

This will detect a much less quantity of quinidine than the Pharmacopœia test. In the latter the ether dissolves a greater portion of the quinidine, while the dilute ammoniacal solution of sulphate of ammonia is an actual solvent, unless great care be taken to add no more ammonia than will exactly precipitate the alkaloids, which is often difficult and tedious.

The second method proposed is the one most generally used by the author, and which is perhaps the easiest and most



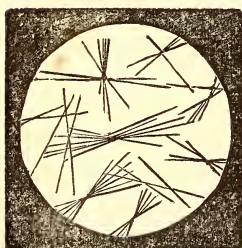
trustworthy of any hitherto submitted. The reagent is sulphocyanide of potassium.

Into an ounce of distilled water drop ten drops of dilute sulphuric acid (British Pharmacopœia  $\frac{3}{5}$ ). To this add 14 grains (or as much as will saturate the acid) of the suspected salt. Filter through paper, and to a little of the filtered solution add a few drops of the solution of sulphocyanide of potassium (180 grains in  $1\frac{1}{2}$  ounces of water). An immediate precipitate of the several alkaloids takes place, each of which, as seen by the sketches, is distinct and characteristic.

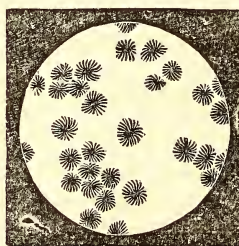
If quinine, quinidine, and cinchonine be present they will all be seen on the slide distinct from each other, becoming more so every minute.

A very good plan is to place a very small drop on a glass slip and to put another of the sulphocyanide by its side. Over both place a piece of thin glass, which will cause the drops to touch. Examine the line of junction under a quarter-inch lens, when the crystals are seen and may be readily recognized. By this method  $\frac{1}{10000}$  of a grain of quinidine or cinchonine may easily be detected.

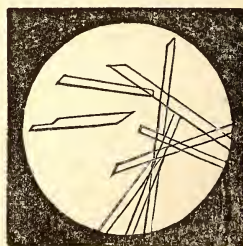
It is very interesting to see the particles all arranging themselves into the respective groups; the long slender needles of the quinine salt, the round crystalline masses of the quinidine,



Sulphocyanide of quinine.  
(450 diam.)



Sulphocyanide of quinidine.  
(450 diam.)



Sulphocyanide of cinchonine  
(450 diam.)

and the large well-formed prisms of the cinchonine salts. So remarkably constant is this reaction, that an observer who has once been accustomed to the general appearance can at once say with ease, this is quinine, this quinidine, and that cinchonine.



Sulphocyanide of potassium is not usually kept by druggists, but may readily be made thus :—

Cyanide of potassium (fused),  
Sublimed sulphur, of each 120 grains.  
Distilled water, an ounce and a half.

Boil in a glass flask for fifteen minutes, filter, and make up the quantity to  $1\frac{1}{2}$  ounces with sufficient distilled water.

This notice of the qualitative analysis ought not to be passed without mentioning a very good application of Prof. Stokes' fluorescent test for the discovery of quinine and other substances possessing the property of epipolism.

A small Geissler's vacuum tube is surrounded by a longer glass tube which is capable of being closed by a cork, an arrangement that permits the tube to be filled and emptied as an ordinary phial bottle. When any bark is suspected to contain quinine, etc., an acid or alcoholic infusion is put into the outer tube, and a spark from the Ruhmkorff's coil passed through. Instantly the fluorescent salt, whatever it may be, will show its presence in the most gorgeous manner.

By this method twenty-seven samples of barks were qualitatively tested in a couple of hours that were supposed to contain a new alkaloid, which occurs in an Australian tree possessing very peculiar fluorescent properties.

The process most applicable for the quantitative analysis of sulphate of quinine is that by means of the iodide of potassium reaction, recommended by Dr. De Vry some time since. The following was the arrangement employed in the present instance :—

Into a tube containing 120 minims of distilled water and 16 minims of dilute sulphuric acid (British Pharmacopœia), add twenty grains of the sulphate of quinine to be tested. When dissolved add 80 minims of solution of hydrate of soda (1 to 12) and 300 minims of *pure* sulphuric ether mixed with six minims of alcohol.

Agitate well, and lay aside for twelve hours ; decant the ethereal solution and evaporate for the *quinine*. To the remaining aqueous solution add just sufficient acetic acid to neutralize the alkali, and precipitate with solution of iodide of potassium (1 to 4), filter, dry, and weigh the hydriodate of

quinidine. One hundred grains of this salt contain 71.68 of pure *quinidine*. To the filtered solution again add hydrate of soda till decidedly alkaline, when the cinchonine and cinchonidine will be precipitated if present.

It was according to the above-mentioned process that the following samples of quinine were analyzed. The first was taken from a four-ounce bottle from Messrs. Howard's and Sons, Stratford.

On submitting it to the soda and ether test there was no appearance of cinchonine, but beneath the ether was an oily substratum, which by the usual tests was proved to be quinidine.

The quantitative analysis showed this to amount to 2.8 per cent. After the separation of the quinidine the soda gave no precipitate, proving the absence of cinchonine and cinchonidine. Consequently this was an extremely pure sample of sulphate of quinine.

The next sample tested was quinine from the laboratory of De Lisle and Co., Paris, better known as "Pelletier's quinine." This yielded 4.1 per cent. of quinidine, and the soda gave a trace of cinchonine.

The third sample was from the chemical works of Mr. Jacob Hulle, Lombard Road, Battersea. This contained 5.6 per cent. of quinidine and .8 per cent. of cinchonine and cinchonidine.

The unbleached variety of the same maker was, as may be expected, much less pure than any of the above.

The sample examined contained 16.3 per cent. of quinidine and 4.2 per cent. of cinchonine and cinchonidine. All these were taken out of bottles unopened and sealed by the manufacturer.

With neither was there any precipitate with nitrate of silver and nitric acid, proving the absence of muriate of cinchonine; neither did strong sulphuric acid produce any tinge except the usual pale yellow tint.

A quinine has lately been introduced by Messrs. Herring and Co., Aldersgate Street, under the name of "semicrystallized quinine," but as it does not profess to be pure sulphate of quinine, but a compound of *all* the alkaloids of the yellow cinchona barks, it ought by no means to be used by the dispenser

as a substitute for quinine without the sanction of the prescriber. The same remark applies to the unbleached variety of Mr. J. Hulle.

A sample from Germany was also examined and found to be exceedingly impure, but as it was not an original package, and without any name, it was thought inexpedient to bring it before the notice of the members of the Pharmaceutical Conference. It is very gratifying to be able to affirm that sulphate of quinine, if purchased in bottles or sealed packets, as sent out by the makers, or obtained through our well-known wholesale houses, is commercially pure and quite fit for medicinal use.

It must be the chemist's own fault if he is imposed upon, and not supplied with an article of sufficient purity.—*London Pharm. Journal*, Nov. 1, 1864.

## ON THE EXTRACTION AND PRESERVATION OF AROMATA.

BY CHARLES R. C. TICHBORNE, F.C.S.

CHEMIST TO THE APOTHECARIES' HALL OF IRELAND, ETC.

(Read at the Bath Meeting of the British Pharmaceutical Conference, Sept., 1864.)

Some time ago I noticed in my garden a vegetable curiosity of some interest. As I was desirous of preserving this *lusus naturæ*, I submerged it in some weak glycerine, considering that that fluid would be less likely to shrivel the tender stems, and also remembering that it had been found most efficient in the preserving of animal tissues.\*

The glycerine answered its purposes admirably, preserving the delicate parts in all their *contour*, and at the same time preventing decomposition.

I immediately saw that this property of glycerine might be made available for certain pharmaceutical processes where it is desired to preserve or to extract the aromata of vegetable products, *i. e.* it is applicable to the preserving of elder, orange, or rose flowers; and also, as will be shortly explained, it may be substituted for the oils and fats used in the process termed *enfleurage*.

Flowers for making the officinal *Aqua Sambuci* may be pre-

\* Experiments of M. De Marquay, "*Journal de Chimie Médicale*."

served for an indefinite period, the following being the mode of operating:—The elder-flowers should be gathered when the corolla is fully expanded, but not too far gone; they should then be plucked from the stem and packed firmly in wide-mouth bottles or jars without crushing them, and finally be well covered with glycerine and corked. It is not necessary that the glycerine should be pure for this purpose, but it should be devoid of odor and have a high gravity (about 1.240 at 60° F.).\* The common glycerine made from soap or plaster has generally a slight odor, which must be got rid of before it is used for this purpose. When they are wanted for the distillation of the water, the flowers with the glycerine are put into a still, or what is preferable, the glycerine is expressed and is then found to be saturated with the otto. Water is then added, the quantity being regulated by the original weight of the preserved flowers, or the amount it is determined to distil. I have preserved flowers for two years, and on distilling them this summer I have procured a water, the perfume of which equalled that made from flowers of this season.

As the essential oil seems soluble in all reasonable proportions, this is a very convenient method of making a concentrated water, either by treating the glycerine after expression with a fresh portion of flowers or by regulating the amount of water added on distillation. This process of preserving flowers will be found to far exceed the old plan of preserving them between layers of salt, particularly as it is almost next to impossible to distil the flowers so preserved without a small portion of the salt being mechanically carried over, which cannot be a *desideratum* in an emollient.

By diluting with water the expressed glycerine, and shaking it with melted lard, and then allowing them to separate, an ointment may be obtained, which has the natural properties and aroma of the elder-flowers.

I will now draw your attention to what may probably be a very useful application of the above properties of glycerine,—I mean in cases where the aroma of the flower is so delicate

\* Pure distilled glycerine has generally a specific gravity of about 1.260 at 60° F., but in ordinary glycerine may be concentrated upon a water bath until it has a specific gravity of 1.240.



as to be much injured, if not entirely destroyed, by the application of heat. When such is the case, the extraction of the perfume by glycerine may be substituted for the process of *enfleurage* as now carried on to such a large extent in the Var district of France.\* The process would then become one of cold maceration, no heat being employed. After digesting the flowers for some considerable time in the glycerine, the latter is expressed and again treated with fresh flowers until the excipient is thoroughly saturated with the volatile oil; the extraction seems perfect, as the glycerine evidently has a great affinity for the odoriferous essences. (Fresh mint placed over a thin layer of glycerine imparts in a short time a considerable odor to that fluid, although it may not be in actual contact.) The saturated glycerine is diluted with water and shaken with a small quantity of chloroform; after well agitating, the latter is allowed to subside; it carries down with it nearly the whole of the essential oil. The chloroformic solution, after being separated by a funnel, should be filtered, if necessary, and allowed to evaporate spontaneously in a shallow vessel. The residual matter dissolved in spirit forms the spirituous extract of the flower, whatever that may be. If operating upon large quantities it becomes desirable to economize. Therefore, in such a case, the greater part of the chloroform may be drawn off in a still, the last portion being allowed to evaporate spontaneously; the boiling-point being so low that even the most delicate perfumes would hardly be deteriorated by the heat employed. Even the offensive smelling bisulphide of carbon, from its ready volatility, may be used; but it must be quite pure, or, in other words, it must be perfectly free from all after-smell on evaporation.

The glycerine may be used over and over again after diluting, passing it through charcoal, and then evaporating it to the desired gravity.

As regards the application of glycerine to the preserving of

\* The commercial importance of this branch of trade may be indicated by the quantity of flowers annually grown in France, *i. e.* 2,284,000 lbs. This only includes orange, cassia, jasmine, and such like blossoms, the perfumes of which are extracted by the aid of fats. (*Vide* Exhibition Record, 1862.)



leaves, etc., for distilled waters, I have myself practically carried it out with great success, having kept flowers for two years, and on opening them, found not only the perfume natural, but the structure of the flowers without the least disorganization. The process proposed as a substitute for the ordinary one of *enfleurage* by fats, of course I merely throw out as a suggestion, as it could only be practically put to the proof at some place where the flowers are cultivated extensively. The great number of men and women employed in the present process at Grasse and Cannes would point out that a great saving would be made both in time and money by a method similar to the above. Another object is that although there are large growers at the above-named localities, the mass of the flowers are grown by cottagers, and collected from them by *commissionnaires*. In the glycerine plan the flowers could be placed in perfect safety as brought in, and by this means all danger from heating by fermentation is thrown out of consideration. I have extracted on the small scale, and by the above means, the aromata from *Heliotropium grandiflorum*, *Cheiranthus Cheiri*, and others. —*Pharm. Journ. and Trans.*, Nov. 1, 1864.

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## ON PREPARATIONS OF CINCHONA.

BY ALFRED B. TAYLOR.

“Is there an eligible means by which the medicinal matter of cinchona may be held in a permanent solution without deposition of cinchotannates or cinchonic red?”

In attempting to answer this query, I supposed the intent of it to be the finding a solvent which shall retain all the remedial properties of cinchona in their natural condition or combination, and without decomposition.

From the peculiar solvent properties of glycerin, it was thought that some combination of this substance with alcohol or sugar might answer the purpose, and accordingly the following experiments were instituted:

A tincture of cinchona was prepared, of the ordinary strength, using a menstruum composed of two parts of alcohol, one part of glycerin and one part of water. After standing for two or

three months there was no deposit from it, but the experiment (being only negative in its character) was not considered conclusive; since it does not follow that because after two months there is no precipitate, there will be none after a greater lapse of time. Recourse was had to another experiment; glycerin was added to the fluid extract of cinchona, prepared according to the U. S. Pharmacopœia, in the proportion of one part of glycerin to three parts of extract; upon heating this mixture it speedily became perfectly clear, much sooner than where the extract was heated alone; but upon cooling, the cinchonic red was thrown down and the mixture again became cloudy and opaque.

Another experiment was then tried, the quantity of glycerin being increased, and equal parts of glycerin and fluid extract being used. This mixture, after being heated as before, remained perfectly clear upon cooling. From this experiment it was thought that a fluid extract might be prepared with glycerin alone, which would satisfy the conditions of the query, and an extract was prepared by the following formula:

Take of Yellow Cinchona, in moderately fine powder, eight troyounces.

Glycerin }  
Alcohol } each eight fluidounces.

Diluted Alcohol a sufficient quantity.

Mix the glycerin and the alcohol, moisten the cinchona with six fluidounces of the mixture, allow it to stand for half an hour, pack it firmly in a cylindrical glass percolator, and gradually pour upon it, first the remainder of the mixture and then diluted alcohol, until two pints of tincture have been obtained or the bark is exhausted; evaporate this to a pint by means of a gentle heat.

A sample of the extract, as thus prepared, is herewith submitted. It is beautifully clear, possesses all the remedial properties of cinchona in perfect solution, is not liable to change by fermentation, as is the fluid extract of the U. S. Pharmacopœia, and is believed to be in many respects superior to that preparation.

The success which attended this experiment naturally suggests the use of glycerin in the preparation of other apothemic extracts, more especially the astringent ones; (no doubt it would be useful in the preparation of fluid extract of rhubarb;) and it is believed that in the hands of future experimenters it will be found a most useful solvent in such preparations.

It was thought that the addition of acids, or perhaps of alkalies in small quantity, to the menstruum might render the tincture of cinchona a permanent solution, notwithstanding the fact that the character of the resulting preparation would be somewhat modified thereby. The addition of ammonia or potassa to the tincture of cinchona deepened its color, and by dissolving the cinchonic red, permanently prevented its deposition. Upon standing, however, minute crystals of cinchonia or quinia, or perhaps both, were deposited upon the sides and bottom of the bottle containing the tincture, and consequently the preparation was more injured than it would have been by the deposition of the cinchonic red, if the alkali had not been added.

The addition of an acid to the tincture of cinchona seems to render the solution almost, if not entirely, permanent; and, although in this experiment, as in the preceding one, the natural combination of the constituents of cinchona bark is not preserved, it is believed that an acidulated tincture of cinchona would, in very many cases, prove a valuable and desirable preparation.

The following formula is suggested for this preparation:

*Acidulated Tincture of Cinchona.*

Take of Yellow Cinchona, in moderately fine powder, six troyounces.

Aromatic Sulphuric Acid half a fluidounce.

Diluted Alcohol a sufficient quantity.

Having mixed the acid with a pint of diluted alcohol, moisten the powder with two fluidounces of the mixture, pack it firmly in a glass percolator, and pour upon it, first the remainder of the mixture, and afterwards sufficient diluted alcohol to make the tincture measure two pints.—*Proc. Amer. Pharm. Assoc.*, 1864.

## ON THE ODOR OF COMMERCIAL TANNIC ACID.

BY WILLIAM PROCTER, JR.

The following query was accepted by the writer :—"Pure tannic acid being an odorless substance, is there an odorous substance in nutgalls, that is found adhering to commercial tannic acid? or is the odor commonly noticed in that substance due to impure ether used in its preparation?"

According to Dr. Wood (U. S. Disp.) "galls are inodorous." Pereira says, "Galls have no odor." (Elements, page 323, vol. II. Am. Edit.) Christison also says, "Galls are without odor." Notwithstanding these opinions, at least two of these authorities give volatile oil as one of the ingredients of nutgalls.

My own examination of galls induces the opinion that, in their whole and dry condition, they have but little odor where they are in a box or drawer; when, however, galls are bruised, or in a powder, a distinct odor is manifest, which is well marked, though not very prominent. When, therefore, ordinary alcoholic ether is allowed to percolate powdered galls, it should remove this odorous substance along with the tannic acid and green and brown coloring matters, and deposit them on evaporation with any impurities the ether may contain.

To put this matter to a practical test, a bottle of ether was procured from Dr. Squibb, which left hardly a trace of odor when evaporated on a surface. This was mixed with a due proportion of alcohol and water, and passed through powdered galls. The ethereal percolate was evaporated to dryness in a capsule, with sufficient heat, until the ether was dissipated. The residue, when dry and brittle, was rubbed to powder. It had a greenish color, and a decided odor of bruised nutgalls, but no odor of impure ether.

A portion of this tannin was digested in benzine, in which liquid, tannic acid is insoluble, and on evaporating the benzine in a glass capsule, until the odor of that substance entirely disappeared, a minute residue, possessing the well marked odor of nutgalls, remained in the capsule.

The inference, therefore, is, that the odor of commercial tannic acid is chiefly due to the odorous principle of nutgalls, to which



is added the coloring matter of the galls, and sometimes odorous matter derived from the ether; and that, owing to the insolubility of tannin in benzine, its odor and some of its color may be removed by digestion with that liquid.—*Proc. Amer. Pharm. Assoc.*, 1864.

## ON THE RANCIDITY OF FATS.

BY THOMAS B. GROVES, F.C.S.

(Read at the Bath Meeting of the British Pharmaceutical Conference, Sept. 1864.)

Some experiments relative to the action of certain odorous principles in preserving the neutrality of fats, commenced in December, 1861, and not yet reported on, would, I thought, form the basis of a paper on the above interesting subject.

To the invalid who suffers from applying to an inflamed surface an irritant instead of emollient substance, as well as to the pharmacist who sustains pecuniary loss from the spoiling of his ointments by rancification, the question is doubtless important.

Rancidity may be defined as the changed condition, assumed sooner or later by all natural fats exposed to air and moisture, such change being characterized by loss of blandness and neutrality and development of pungency and acidity.

The cause of change being hidden, or at best imperfectly understood, the change has been termed spontaneous, or classed among those determined by catalytic influence. Chemically speaking, it consists in the separation of the neutral fats into its components, fatty acids and glycerin,—the latter substance almost invariably accompanied by obscure products of decomposition of an offensive and noxious character.

Palm oil is, I believe, the only fat that has been observed to separate *distinctly* into acid and glycerin.

It will throw much light on the nature of the change if we carefully watch its progress from the first appearance until the full development of rancidity.

That is done with most ease in ointments containing coloring matter of a vegetable origin, such as savine, or mineral, as oxide of mercury; but in pure lard it is not difficult.

The best chemical test of rancidity I find to be iodide of po-



tassium, which when mixed with fat in the least degree affected, quickly assumes an orange color, indicative of the presence of free iodine, the tint being directly proportional to the amount of rancidity. Thus I have found that when added to fat extremely rancid, the coloration is intense and immediate; when added to mixtures of this fat and other perfectly neutral, the coloration is less and less according to its dilution, and is plainly perceptible when the fat contains only one-twentieth, but a longer time is required for its development.

Acidity cannot be relied on as the index, for it will be found, that whereas the highly rancid fat, when boiled with alcohol, yields a solution reddening decidedly, though not promptly litmus-paper, a mixed fat, such as the above, gives a negative result.

When rancidity first shows itself in a pot of lard that has been filled with the melted fat and not subsequently disturbed, the following phenomena may be observed. Here and there throughout its contents, but more especially at the points where the lard touches the sides of the stoneware jar, small patches of a whiter and more crystalline aspect than the bulk have made their appearance. If these patches are tried by iodide of potassium, they will be found to be highly rancid, whilst the surrounding parts retain unimpaired their original freshness. As the process advances, these patches increase in size and number, until the whole mass has become infected. How far the action would proceed if time were given it is uncertain, but ordinary cases of rancidity are caused by the splitting up of a small portion only of the fat. From the change taking place in situations to which the air cannot be supposed to penetrate,—for instance, the interior of a homogeneous mass of fat,—it may be inferred that air is not necessary to its *propagation*. Analogy coupled with the observation that rancidity first makes its appearance at the sides of the vessel, where possibly from contraction during cooling a small air-space may have been left, point to the necessity of air being present at its *commencement*. In fact, it is pretty sure that the phenomena are caused by a species of fermentation involving the joint action of air, water, albuminous matter, and a moderate degree of heat. Such is the opinion of M. Pelouze, who has written much on the ques-

tion, and of whose valuable labors I have freely availed myself.

There can be no question of the presence of water in all neutral fats; albuminous matter in some form may also be safely assumed to be in company with it. It is often met with in a flocculent form at the bottom of jars of olive oil, and cannot fail to be present in all fats of animal origin, whilst MM. Saussure and Pelouze have noted the absorption of oxygen during the drying of siccative oils, some of which in return evolve hydrogen and carbonic acid. I have myself observed a candle lowered into a jar partly filled with cod-liver oil, that had remained some time in contact with the air in the upper part of the vessel, suddenly extinguished. It is doubtless true, on the supposition of a ferment being the agent that effects the disturbance, that the removal of any one of the essential conditions would prevent its action. But can it be done in a practical way? I believe not. To remove the last trace of *humidity* would be impossible, except by tedious and expensive methods. Still, a partial drying is better than none, and the experience of housewives is unanimous on the point as regards the melting of lard, which they say will not keep unless it has been made to boil. *Albumen* has been sought to be removed by agitation with sulphuric acid of 40° Beaumé, washing with water and subsequently drying. The process was employed some years ago in preparing rape oil for burning in light-houses, and was found to hinder its oxidation. I have not been able to imagine an *easy* process for freeing oils, etc., of this dangerous ingredient, and have, therefore, made no experiments in that direction. M. Pelouze made many attempts to insulate the body, but failed. Nevertheless he was able from its effects to identify it as one of the albuminous series. I shall be able to show, further on, that its activity may be effectually neutralized by a simple method. The entire exclusion of *air* is of course practically impossible.

The length of time required for the development of these changes makes experimenting very tedious, and renders one unable to do so much in a given time as one could wish. I have, therefore, confined myself within very narrow limits, relating to practical remedies only, and to lard as the base of experiment.

Shortly after the use of benzoinated lard had been recommended for the preparation of zinc ointment, which it is well known to preserve against rancification, I applied with success the same idea to other ointments of similar composition, viz.: those containing metallic oxides, whose presence had been found to act unfavorably on the keeping qualities of the fats with which they were associated. These were calamine cerate and oxide of mercury ointment. I have found that M. Deschamps, in 1843, recommended the same proceedings in making oxide of mercury ointment, and also the ointments of iodide of potassium and acetate of lead. For ointment of tutty and blue ointment, where a little extra color would not be objectionable, he directs the use of "graisse populinée, the keeping qualities of which are really extraordinary. M. Deschamps states that whilst the "graisse benzinée" will keep good for one year, the "graisse populinée" will keep good for an unlimited time. He suggests its use for greasing machinery even. I intended to make some of this preparation, but could not get the poplar buds. The French perfumers, in preparing the base of their pomades, adopt a process somewhat similar, viz., digestion with benzoin after a preliminary washing, and boiling with solution of salt and alum. Their method yields a stable fat, but it is too troublesome to be frequently performed, and succeeds best on the large scale,—consequently is not well adapted for the pharmacist.

For experiment on the nature of the preservative power exercised on fats by bodies like benzoin, the oxide of mercury ointment was evidently well adapted, as the progress of rancification is marked by alteration of color—the oxide being reduced *pari passu* with the oxidation of the fat.

It was my impression that the essential oil had more to do in the matter than any other constituent of the gum, though it had been asserted that benzoic acid answered equally well. But the acid of commerce contains an abundance of the odorous principle.

To test the truth of the surmise, and at the same time ascertain what degree of effect, if any, was produced by various essential oils, I prepared, on December 5th, 1861, a quantity of red precipitate ointment, using ordinary lard and wax in the

prescribed proportions, and a smaller quantity using benzoinated lard. To small portions of the former I added essential oils, in the proportion of four drops to the ounce. The oils I used were fennel, almond, bergamotte, cassia, turpentine, lavender, neroli, lemon, rose, rosemary, caraway, nutmeg, savine, pimento, cumin, clove and sassafras. I also tried creasote, balsam of Peru, Venice turpentine, and powdered guaiacum. These were all put into willow boxes, and, in order to hasten the reaction, placed in a warm situation, whose temperature ranged between 70° and 80°.

On the 28th of the following February (85 days), I observed the ointment made with plain lard to be slightly discolored. By the 11th of March (96 days), the change had developed itself in the lavender, neroli, lemon, rosemary and caraway, which, with the plain, *were most discolored*. Next came cassia, Venice turpentine, less discolored, and then fennel, almond, and bergamotte, least discolored. In some cases the interior was more discolored than the exterior. April 19th, 1862, (135 days), the most changed were the plain and bergamotte; the next best, cassia, lemon, rosemary, lavender, almond, and turpentine; the least changed, neroli, Venice turpentine, fennel, and caraway. The rest continued good. On the 2d of June (179 days), the only kinds remaining undiscolored were rose, pimento, clove, creasote, cumin, sassafras, guaiacum, and balsam of Peru, the least affected of the remainder being benzoin, which now had given way.

By the 10th of September, (279 days), rose and cumin had become discolored, leaving good only clove, pimento, Peruvian balsam, sassafras, guaiacum, and creasote, all of which at the present date are apparently as good as ever.

December 5th of the following year (1862), I put by, under the same circumstances, another series of ointments containing four drops to the ounce, and a second series containing only two drops to the ounce of the following oils, etc.:—Clove, sassafras, pimento, balsam of Peru, and creasote,—those, in fact, that had comported themselves best on the prior occasion.

By May 5th, 1862 (151 days), the plain ointment was spoiled. By August 11th, 1862 (249 days), the benzoinated and No. 2, sassafras. At the present date (August 29th, 1864), balsam of



Peru No. 2 shows symptoms of giving way, but all the rest are apparently as good as ever. In order to ascertain the actual condition of the fats—to try whether or not the test of color could be relied on—I recovered them by means of benzole from the No. 2 creasote and No. 2 pimento, and found them react perfectly neutral with iodide of potassium, notwithstanding they had been purposely kept under the most unfavorable conditions for upwards of twenty months.

The action of creasote, the great antiseptic, is not difficult to understand; but whether the essential oils shared its power to prevent the putrefaction of albumen remained to be proved. To do so, I prepared a filtered solution of egg albumen, and to 2-ounce portions of it, placed in 3-ounce bottles, I added two drops of each of the essential oils I had used with the ointments, dissolved in  $\frac{1}{2}$  drachm of rectified spirit. One portion, mixed with spirit only, was placed with them for comparison. They all were set aside in the situation previously occupied by the ointments. The unscented albumen became putrid in twenty-eight days; the other specimens are still good. I expect them to observe the same order in this experiment as in those with the ointments. I may add, that all these essential oils precipitate albumen, some more, some less.

Having succeeded so well with the ointment of oxide of mercury, I commenced, January 22d of this year, to try similar experiments on pure lard.

Twelve pounds of fresh flare were completely deprived of flesh and membrane, bruised well, washed under a stream of water, and placed in a porcelain vessel over a water-bath. As soon as one-third was liquefied, that portion was strained and set aside. The temperature had not exceeded  $140^{\circ}$ . This lard I shall refer to as No. 1.

The rest was kept on the bath one hour after total liquefaction, then strained, its temperature being  $190^{\circ}$ ; half of it was set aside = No. 2.

The remainder was gradually heated to  $220^{\circ}$ , and kept at that temperature for five minutes = No. 3. It was much firmer than either of the preceding, and maintained that distinction after being stirred.

Of each of these lards I set aside, in willow boxes, three



specimens, viz. : lard well stirred, lard mixed with oil of pimento in the proportion of two drops to the ounce, lard mixed with oxide of mercury one drachm to the ounce,—and placed them where the temperature ranged between  $70^{\circ}$  and  $80^{\circ}$ .

On the 21st of April (ninety days) I first observed a change in the lards mixed with oxide of mercury,—No. 1, strained at  $140^{\circ}$ , being the least, and No. 3, strained at  $220^{\circ}$  the most altered. The scented and plain lards, tested with iodide of potassium, all produced slight coloration after half an hour, but the scented lards less than the plain. No. 3 appeared to better advantage than the less heated specimens. After thirty hours' exposure on the slab to light and air, a most extraordinary change was observed. Nos. 1 and 2 of the plain lards had assumed an orange color, No. 3 a similar tint, but only half as dark, whilst the scented lards had lost rather than acquired color,—in fact produced an ointment at that time perfectly saleable. The contrast was most striking, and continued so for two months; by which time *all* the specimens were of an orange color, but the scented lards only *externally*,—probably affected by the fumes of the laboratory.

These same lards were again examined July 7. Those mixed with oxide of mercury were all hopelessly bad. The rest were tested with iodide of potassium, and after eight hours' exposure presented the following appearances:—Nos. 1, 2, and 3 of the plain were of a lemon color, the tint of No. 1 being less than that of No. 2.; of No. 2 less No. 3. The scented lards still maintained their superiority, Nos. 1 and 3 being quite useable, No. 2 not so.

August 26th, I again examined them, with the same results.

I therefore conclude that oil of pimento, which, of those that had maintained the neutrality of oxide of mercury ointment, appears the best adapted for the purpose, is a useful, agreeable and easily applied remedy for preventing or very much retarding rancification in fats and fatty mixtures.

I think I am also justified in adding this corollary—that it is advisable when preparing ointments with a view to their preservation, to use ingredients retaining unaltered the odorous principles with which nature has for obvious purposes endowed them; that is to say, I would use yellow wax instead of white

wax, yellow olive oil instead of bleached olive oil. In fact, experiment has shown the superiority of these bodies not meretriciously tampered with, over the same bodies to which a false appearance of excellence had been given by exposure to bleaching agents, no matter how simple and apparently harmless their nature.

The experiments on the effect of temperature I have repeated more than once. They go to prove that it is not advisable to push the heat beyond that of the water bath, nor maintain it too long at that temperature. I say this feelingly, as the undecisiveness of my first experiment and a certain amount of belief in the old wives' tale about *boiling* lard, induced me to try the superheating process on a large scale,—and most unfortunate was the result.

I consider the British Pharmacopœia process, where the flare is melted by water-bath, the fat strained from the membrane as soon as possible, and then dried by water-bath, to be an excellent one. I would only suggest the advisability of adding to it oil of pimento or balsam of Peru, in the proportion of two drops to the ounce, before placing it in stock. Such addition does not in any way interfere with its medicinal use, and would as I have shown, much conduce to its preservation.—*Lond. Pharm. Jour.*, Nov., 1864.

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## ON THE PHARMACEUTICAL APPLICATIONS OF GLYCERINE.

BY MR. F. BADEN BENDER.

Read at the Bath Meeting of the British Pharmaceutical Conference, Sept. 1864.

The Edinburgh branch of the Pharmaceutical Society thought proper to award me the President's Prize for an essay on this subject a few months since, and it is from that paper chiefly that I have taken the following notes. It is needless to detain the Members of the Conference by giving a detailed account of the introduction of glycerine into pharmacy, nevertheless I should like to make a few remarks on this part of the subject. Glycerine, as is well known, was discovered by Scheele; but I find considerable discrepancy in the ascribed dates. Watts, in

his "Chemical Technology," gives 1776; Demarquay, in his recently-published treatise "De la Glycérine," Gerhardt, and others, 1779; M. Chevalier, in reporting on a paper by M. Bruere Perrin in the "Journal de Chimie Médicale," 1782-83; while Dr. Abbotts Smith and others make it as late as 1789; but the fact that Scheele published his discovery in the "Transactions of the Royal Academy of Sweden" in 1783, seems to prove the latter date erroneous. It is to M. Chevreul, however, that we are indebted for giving to this substance "a local habitation and a name," which he accomplished about thirty years after its discovery, by demonstrating the true part it played in the constitution of fatty bodies (viz., that of a base, combined with stearic, margaric, and oleic acids). He gave it the name of glycerine, it having been previously known as the "sweet principle of oils." In 1844 it was first used in England as a therapeutic agent, but attracted little attention till the publication of the admirable papers of M. Cap, in the "Journal de Pharmacie et de Chimie" for February, 1854, and MM. Cap and Garot in the same Journal, August, 1854. These gentlemen pointed out the peculiar advantages offered by glycerine as a solvent, and, by a very complete course of experiments, suggested for it almost innumerable pharmaceutical applications. They devised means of obtaining it in a much greater state of purity from the waste liquors of the soap-boiler than it had hitherto been supplied, but it was found impossible to rid it entirely of the impurities (especially volatile fatty acids) derived from the substances used in the manufacture of the soap. The purest glycerine was at this time obtained during the process of making lead plaster. A very important discovery was made by Mr. Richard Albert Tilghman, of Philadelphia, about this date, viz., the possibility of separating glycerine from fats by the aid of heat and water only. A patent was granted to this gentleman January 9th, 1854. In his specification Mr. Tilghman says, "I subject these fatty or oily bodies to the action of water at a high temperature under pressure, so as to cause the elements of these bodies to combine with water, and to obtain, at the same time, free fat acids, and solution of glycerine." The temperature used by Mr. Tilghman was that of melted lead (612° F.). Great improvements in the details of this process were shortly after-

wards made by Mr. G. F. Wilson, F. R. S., of the firm of Price and Co., Vauxhall. As a source of glycerine he employs palm-oil bleached by exposure to the air; this is decomposed in suitable apparatus by steam at a temperature of  $550^{\circ}$  to  $600^{\circ}$  F., maintained for several hours. The glycerine is then allowed to distil over with the fat acids and water, and is concentrated by evaporation. Price's glycerine is well known at home and abroad for its great superiority and almost absolute purity, being of necessity free from inorganic matter. For, as Mr. Wilson has himself said, "The only chemical agents used for decomposing the neutral fat, and separating its glycerine, are steam and heat, and the only agents used in purifying the glycerine thus obtained, are heat and steam." Mr. Wilson tells me that they are now making one ton per week of this pure medicinal glycerine, and, in order to ensure its perfect purity, it is frequently distilled five or six times. Like Bennett's watchès, Price's glycerine leaves "nothing to be desired but the money wherewith to buy it."

It is in external remedies that the greatest field appears to be open for the further introduction of this substance in pharmacy, and I shall first call attention to the compound of starch and glycerine known as "plasma." It had long been thought desirable to find a substitute for fatty matters in ointments not liable to become rancid, and in 1858 Mr. Schacht, of Clifton, read a paper before the Pharmaceutical Society, in which he proposed for that purpose a mixture of seventy grains of starch with one ounce of glycerine, heated together to a temperature of  $240^{\circ}$  F. The product is a plastic mass well suited in most respects for the purpose, but has been objected to from its tendency to absorb moisture and become fluid by long exposure to the atmosphere. The inconvenience arising from this source, however, might be easily obviated by keeping the plasma in air-tight jars, and dispensing it when necessary in wide-mouthed bottles. A much more serious hindrance to its general use is the fact that it costs about five times as much as the ordinary adipose basis of ointments.

I have made a variety of experiments with "plasma," substituting in its composition for the common wheat starch that of arrow-root, rice, potato, tous-les-mois, etc., all of which yield



compounds differing from each other in some of their physical properties. The arrow-root plasma is beautifully transparent, but has an objectionable tenacity if more than sixteen grains to the ounce be used. On the whole, I prefer the *tous-les-mois* preparation to any other. The best mode of preparing this is, to rub together in a mortar fifty grains of *tous-les-mois* with one ounce of glycerine; transfer this to a porcelain evaporating-dish, and heat over a gas flame to a temperature of  $240^{\circ}$ , constantly stirring with an ivory or wooden spatula. (A prescription recently came under my notice, in which an eminent surgeon had ordered starch and glycerine to be heated to this temperature over a water-bath!!) Some pharmacutists recommend that the plasma should be kept at  $240^{\circ}$  for twenty minutes, but I see no advantages likely to accrue from this, and unless great care be taken to regulate the temperature the compound will become colored, and will always be found to have diminished considerably in weight, a result not at all satisfactory to the operator. If the application of heat be continued only long enough to burst the starch granules, or till the mixture becomes transparent, the loss will be about twenty grains to the ounce. The presence of a little water is not detrimental; indeed, I believe it improves the condition of the product, as it will be found more plastic and better suited for rubbing over the surface of the skin, even after it has been exposed to the air a few weeks, and thus absorbed more moisture. M. Surum, a French pharmacist, who has paid much attention to the subject, advises ten per cent. of water to be added to the starch previous to mixing it with the glycerine. I do not think plasma would be advantageously substituted for fats in all ointments, but in those cases where there is a great tendency to rancidity, as in the *Cer. Calam.*, *Cer. Plumbi Acet.*, *Ung. Zinci*, etc., of the old *Pharmacopœia*, and where the active ingredient of the ointment is soluble in glycerine, as in the *Ung. Potass. Iod.*, *Ung. Aconitiæ*, *Ung. Atropiæ*, *Ung. Belladonnæ*, *Ung. Creosoti*, and *Ung. Veratriæ* of the British *Pharmacopœia*, the plasmas appear preferable to the analogous ointments; it also has the advantage of being easily removed from the skin without the aid of soap or friction.

Those preparations in which glycerine alone is the basis have



received the name of glyceroles. Many substances are more soluble in glycerine than in water or alcohol. When an aqueous or spirituous solution is applied to the skin it rapidly becomes dry; and it seems reasonable to suppose that absorption would then be greatly retarded. Glycerine is free from this objection, and its peculiar power of penetrating the pores of the skin renders it the best menstruum for many substances. Dr. Richter, of Vienna, proposed, in 1857, a caustic application, composed of one part of iodine, two of iodide of potassium, and two of glycerine. I am surprised that this in various states of dilution has not been more frequently used instead of the tincture. Glycerine dissolves five grains of iodine to the ounce without the addition of iodide of potassium. A glycerole, composed of tannin one part, glycerine four parts, is a very elegant preparation, and is used as an application to the throat, etc., *per se*, and as an addition to gargles, lotions, injections, etc. One ounce of glycerine dissolves fifteen grains of atropia, and seems to offer some advantages over solutions containing acids in combination with the alkaloid in ophthalmic surgery. Borax is soluble in glycerine to the extent of fifty per cent., and by adding this solution to tincture of myrrh, we obtain a "tincture of myrrh with borax" superior to that prepared in the ordinary manner. The non-resinous vegetable extracts are soluble in glycerine,—a solution of the alcoholic extract of Calabar bean has lately been used with success.

In the other class of medicaments, viz., internal remedies, the use of glycerine has hitherto been more limited. Although glyceroles have often been brought before our notice as substitutes for syrups, I do not find that they generally possess any superiority. I have prepared the glycerole of iodide of iron in two ways:—first, by making a very concentrated solution of iodide of iron (about equal weights of water and iodine with iron wire, *q. s.*) and filtering this solution into glycerine; and, secondly, by a process suggested by Mr. James C. Leamy, of America, in 1848, viz., to make a more dilute solution of the iodide, mix with the glycerine, and evaporate the water over a water-bath. The former is nearly colorless, but remains so only for a few days. The latter is of a pale straw color, and appears much less liable to undergo further change. A glycerole of carbonate

of iron may be made by dissolving separately, each in 2 ounces of glycerine, 76 grains of sulphate of iron and about 60 grains of carbonate of potash, and mixing the solutions. The result will be a pale-green solution of carbonate of iron, containing 1 gr. in fʒi., which will keep a considerable time without change. The carbonate of iron is thrown down as a flocculent precipitate on the addition of water. Gum Ammoniacum forms a white creamy emulsion with glycerine, in the proportion of ʒi. to fʒi., which, according to Demarquay, does not separate. I imagined this might be useful for the instantaneous production of a kind of Mist. Ammoniaci, but the result of my experience is that the resinous part of the Ammoniacum gradually separates and rises to the surface, leaving an opalescent solution of the gummy constituents below. There is one other use for glycerine which must not be overlooked,—that of an excipient in pill-masses. Alone or diluted with an equal weight of water it is decidedly the best thing for “making up” pepsine and vegetable powders, care being taken not to add too much, and to thoroughly knead the mass. Pills made with this do not become hard, and are therefore always in a condition to be readily dissolved in the stomach. A two-ounce wide-mouthed bottle fitted with a cork perforated in two places, through one of which a piece of quill is inserted for dropping the glycerine from, will be found a very serviceable adjunct to the dispenser’s board.

Glycerine has been honored with a place in the British Pharmacopœia, where, however, it has only been thought worthy of acting as a solvent for the tannin in “Suppositoria Tannici.” The test there given is that it shall have a density of 1.26 (the new Pharmacopœia of the United States gives 1.25). Price’s is almost the only sample I have met with which reaches this standard, the specimens of foreign glycerines I have examined being considerably below the mark, and, with one exception, having a disagreeable odor. This odor may easily be detected by rubbing a few drops on the back of the hand. One of the worst of these importations was advertised as “equal to Price’s in every respect.” I have not detected much inorganic impurities in the foreign glycerines, and the presence of water would be of comparatively little import, if it were possible to free them from the well-known rancid odor, which renders them totally

unfit for pharmaceutical uses. The olfactory nerves of that man must indeed be torpid, who fails to discover a wide difference between Price's and the cheaper glycerines. Should odor, however, not be sufficient proof, let a little solution of nitrate of silver be added to the specimen in a test tube and exposed to the light; Price's will be found to remain nearly colorless, whilst the inferior samples will rapidly become dark-colored. When we are able to obtain Price's glycerine, or glycerine equal to it in every respect, at 1s. 6d. per pound, I have no doubt but it will find many applications in pharmacy from which it is now debarred by its great cost.—*London Pharm. Jour.*, Nov., 1864.

## ON THE MORPHIA SALTS OF COMMERCE.

BY W. E. HEATHFIELD, F. R. G. S.

(Read at the Bath Meeting of the British Pharmaceutical Conference, Sept., 1864.)

Amongst the many vegetable products from which are obtained the alkaloidal bodies, there are none, as at present known, of so complex a character as opium; none which yield so largely their crystalline formations, and none which afford so many substances, each presenting a different feature and a different habit.

Of these substances, amounting to about eleven, six have been carefully analysed, and the verifications of the results by Professor Anderson, of Glasgow, together with the experimental performances upon some of them by Mr. How, have contributed much to render this part of the subject complete. The subjoined list indicates the six bodies to which I refer, and the composition of each:—

Morphia . . . . .	$C_{34}H_{19}NO_6 + 2 \text{ aq.}$
Codeia . . . . .	$C_{36}H_{21}NO_6$ “
Thebaina . . . . .	$C_{38}H_{21}NO_6$ “
Papaverina . . . . .	$C_{40}H_{21}NO_8$ “
Narcotina . . . . .	$C_{46}H_{25}NO_{14}$ “
Narcein . . . . .	$C_{46}H_{29}NO_{18}$ “

And it is to be observed that the two first-named, *i. e.* morphia and codeia, differ from each other exactly by  $C_2 H_2$ , and it suggested itself to Mr. How (whose experiments were tried in the year 1853, as detailed in the ‘*Journal of the Chemical Society*,’

vol. vi. p. 125, May, 1854), that morphia might be converted into codeia by the decomposition of an agent ready to part with the elements in question, and so produce the proposed effect.

But easy as the transition of morphia into codeia appears, on a comparison of their respective rational formulæ, the object was not attained by Mr. How, who came to the conclusion, that by any means at present within our reach, no great stimulus is afforded to us to prosecute inquiries for the production of this or other of the natural alkaloids. It is true that Mr. How obtained, by means of iodide of ethyl acting on morphia, a salt isomeric with hydriodate of codeia, but beyond isomerism it was in no way identical with it, for the base of the new salt was widely different in its physical and chemical properties from codeia. Yet it has been thought by some eminent manufacturers of morphia and codeia, that there is a tendency on the part of the former to change into codeia under the influence of certain agencies, and it would be an interesting feature if this point could be established.

In following out some experiments, having in view the state of hydration, and the freedom from codeia of the morphia salts of commerce, I endeavored, after examining samples from various sources, to confine myself more especially to those of different manufacturers, and I propose to report upon three specimens, each being of different make. Of each specimen 100 grains (of hydrochlorate of morphia) were dried at a temperature of  $212^{\circ}$ .

No. 1.	100 grains.	Weight after drying,	95 grains : loss, 5 grains.
No. 2.	100 grains.	“ “	92 grains : loss, 8 grains.
No. 3.	100 grains.	“ “	90·2 grains : loss, 9·8 grains.

The characteristics of solubility were as follows :—

No. 1, immediately on contact with water, became dark in color, and united to form a clot, taking some minutes to dissolve, and then forming a solution somewhat colored.

No. 2, on contact with water, became very slightly colored, formed but little clot, and dissolved in less time considerably than the former, producing a solution slightly tinted.

No. 3, not at all darkened on contact with water, remained pulverent, and separate, and dissolved with rapidity, forming a perfectly colorless solution.



On precipitating a solution of 100 grains of hydrochlorate of morphia from each of the three specimens, the results were as follows:—

No. 1.	Precipitate, colored yellow, and pulverent (dried at 212°)	79·7.
No. 2.	Pearly white, crystalline . . . . .	76·7.
No. 3.	Less white, less crystalline . . . . .	74·3.

These precipitates were entirely soluble in a solution of caustic potash; and were scarcely acted upon by anhydrous ether.

100 grains of acetate of morphia from each of three specimens were subjected to a temperature of 212°, and lost as follows:—

No. 1.	100 grains.	Weight after drying, 95 grains : loss, 5 grains.
No. 2.	100 grains.	“ “ 90 grains ; loss, 10 grains.
No. 3.	100 grains.	“ “ 87·4 grains : loss, 12·6.

No. 1, on applying the heat of water bath, became dark-colored, fused into a colored mass, and finally lost its structure.

No. 2 on applying a similar heat, became partially fused and dark-colored, but scarcely lost its structure.

No. 3, retained its pulverent form throughout the process.

On an examination being made of the precipitates by ammonia from the hydrochlorate of morphia, they proved to be morphia in a high degree of purity, perfectly soluble in caustic potash, scarcely acted upon by ether, and almost entirely free from codeia, as was also the mother-liquor from which they had been precipitated.

On a review of these experiments, it will be observed that the three samples of hydrochlorate of morphia contained varying proportions of water, and varying quantities of the alkaloid in like proportion,—that which was the least soluble, No. 1, having the largest proportion of the alkaloid; that which was most so, containing the largest proportion of water, as in No. 3; the difference between No. 1 and No. 3 being equal to nearly five per cent. of water, and nearly five and a half per cent. of alkaloid. The codeia appeared in each specimen to have been carefully separated. The range of moisture in the acetate was a little wider than in the hydrochlorate, the loss in No. 1 being five per cent., whilst that in No. 3 was about twelve and a half per cent.

I regret that I have not been able to carry out this investigation



to the extent that I had proposed and wished, but should I be again permitted to furnish a paper to the Conference, I hope to devote more attention, and to direct my observations more usefully.—*London Pharm. Jour.*, Nov., 1864.

## EXPERIMENTAL RESEARCHES ON OPIUM AND ITS ALKALOIDS.

BY M. CLAUDE BERNARD.

This eminent physiologist was led to experiment on the effects of all the alkaloids of opium from noticing great and unexpected variations in those effects when the alkaloids were employed to facilitate experiments on living animals. He found, in fact, that the six principal alkaloids—morphea, narceia, codeia, narcotina, papaverina and thebaina—each produced a particular effect, but the action may be classed under three heads—the soporific, the exciting or convulsive, and the poisonous action. The relative power of the alkaloids to produce these effects is indicated by their position in the following table:—

Soporifics.	Excitants.	Poisons.
Narceia	Thebaina	Thebaina
Morphea	Papaverina	Codeia
Codeia	Narcotina	Papaverina
	Codeia	Narceia
	Morphea	Morphea
	Narceia	Narcotina

Thus it is seen that three only produce purely soporific effects, but even these vary greatly in character and degree. Morphea, for example, produces a stupifying effect. The animal is scarcely insensible, but becomes a sort of living machine, and will remain in any position in which it is placed. The sensitive nerves are extremely dull, and the extremities may be strongly pinched without disturbing the animal. When roused by a noise it seems frightened, but quickly relapses into narcotism. As the animal awakens it has a haggard look, and the hinder extremities seem partially paralysed, so that it walks like a hyæna.

The effects of codeia are essentially different. The animal is tranquil, and seems to be in calm sleep, but he is at the same time very excitable; a slight noise wakes him up, and he runs

away. The sensitive nerves are much less affected than by morphia, and no paralysis is observed when the animal awakens.

Narceia seems to produce the combined effects of morphia and codeia, and appears to be the most strongly soporific principle in opium. The animal sleeps more profoundly, but is not so much stupified as with morphia; and at the same time is not so excitable as when under the influence of codeia. It quickly returns to its natural state, and on awaking is neither frightened nor savage.

All these effects have been confirmed by repeated experiments on all available animals, and they appear to be constant and invariable.

Coming to the poisonous effects of the alkaloids, the author informs us that thebaina is the most active poison. A decigramme of the hydrochlorate of this alkaloid injected into the veins of a dog killed it in five minutes; but it is stated that *two grammes* of hydrochlorate of morphia injected into the veins of a dog of the same size did not cause death. There must, we think, be some mistake here; *two decigrammes*, perhaps, are meant. Codeia stands intermediate as a poison.

Thebaina also stands first as the most powerful agent in producing convulsions.

The inquiry which M. Bernard has thus opened is very large and important, and will, no doubt, be followed out with all the skill and care for which he is distinguished.—*Comptes Rendus*, and *Chem. News*, Sept. 10, 1864.

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#### EROSION OF LEAD BY INSECTS.

A letter to the *Times*, signed "Y," states that the erosion of lead by certain species of insects is not generally known, and may be extremely mischievous. Not long ago it attracted the attention of the French Academy of Sciences, and several communications upon it have been published in their proceedings, the *Comptes Rendus*. In 1858 Marshal Vaillant exhibited to the Academy leaden bullets brought back from the Crimea, in some of which the larvæ of insects had excavated circular passages three or four millimetres in diameter; but nothing of the kind had been detected in the cartridges of the Russian army

in the Crimea, and the insect which damaged the French cartridges appears to have been imported in the wood of the cases in which they were packed. The insects do not eat the lead, but simply bore it out. In 1833 Audouin exhibited to the Entomological Society of Paris sheet lead from the roof of a building deeply grooved by insects. In 1844 Desmarest mentioned erosions of sheet lead by a species of Bostriche (*B. Capucina*), and illustrated the fact by cartridges from the arsenal at Turin. Mr. Westwood, the well-known British entomologist, has recorded observations on the perforation of lead by insects. M. Bouteille, curator of the Museum of Natural History at Grenoble, sent to the French Academy of Sciences from the collection under his charge specimens of cartridges gnawed by insects, which were found *in situ*, and the reports on the subject by Marshal Vaillant, de Quartrefages, and Milne Edwards, state the insect to be *Sirex gigas* a large hymenopterous species, which, in the larva state, lives in the interior of old trees or pieces of wood, and which, after the completion of its metamorphosis, quits its retreat for the purpose of reproduction. Scheurer-Kestner, in 1861, communicated to the French Academy a notice of the erosion by an insect of the sheet lead of a new sulphuric acid chamber. The creature was caught in the act of escaping through the lead, having been imprisoned between it and a wooden support. But perhaps the most interesting and important case of insect erosion is that of stereotype metal, which was communicated in 1843 by M. du Boys to the Agricultural Society of Limoges.—*Chem. News*, Oct. 1, 1864.

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#### THE PREPARATION OF MATCHES FREE FROM PHOSPHORUS.

Hierpe has published\* the following receipts for a composition for the heads of matches, and for an igniting surface. That for the matches is as under :

Chlorate of potash	.	.	.	4 to 6 parts.
Bichromate of potash	.	.	.	2    "
Ferric oxide	.	.	.	2    "
Strong glue	.	.	.	3    "

\* *Polytech. Centralblatt*, 1864, p. 696.

Oxide of iron may be replaced by oxide of lead or of manganese. The above preparation will not ignite on sandpaper, but requires a surface specially prepared for it, and the author employs the following on the boxes :

Sulphide of antimony . . . . .	20	parts.
Bichromate of potash . . . . .	2 to 4	“
Oxide of iron, lead, or manganese . . . . .	4 to 6	“
Glass powder . . . . .	2	“
Strong glue or gum . . . . .	2 to 3	“

Another composition is described by Dr. H. Poltzer.\* A solution of sulphate of copper is divided into two equal parts—one is supersaturated with ammonia, the other with hyposulphite of soda. The two solutions are now mixed, and the mixture is briskly stirred. A violet-colored powder now deposits, which is a compound, says the author, of hyposulphurous acid with oxide and suboxide of copper, soda, and ammonia. A mixture of this salt with chlorate of potash detonates when struck with a hammer, and when rubbed in a mortar ignites and burns like gunpowder, leaving a black residue.

The above salt the author proposes to use for matches. It is not soluble in water, and the mixture with chlorate of potash is not hygroscopic. The mixture may be made with moist chlorate and the gum solution, and can be safely dried at 50° C. or higher. It inflames when rubbed on a rough surface, and the temperature developed is sufficiently high to ignite sulphur on the stick.

The only difficulty the author finds is in making the mass coherent : when dried on the stick he found that it would crack and drop off when rubbed. A manufacturer will probably soon overcome this difficulty.

The proportions made use of were one part of the copper salt, and two parts of chlorate mixed in a sieve, and then made into a mass with solution of gum, together with a little glass powder. This mixture was applied to matches dipped in sulphur as usual.—*London Chem. News*, Dec. 10, 1864.

\* *Polytech. Centralblatt*, 1863, p. 1642.



## Editorial Department.

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BRITISH PHARMACEUTICAL CONFERENCE.—In our last number reference was made to the meeting of this body at Bath, England, September last. The Pharmaceutical Journal of November contains the scientific papers read on that occasion, which have swollen the Journal to double its usual size. Some of these papers will be found in this number; that of Mr. Groves on the rancidity of fats, and that of Mr. Stoddart on the purity of sulphate of quinia, deserve attention. We hope in future numbers to reprint several others. Among those read that attracted most attention was that on Weights and Measures used in Pharmacy, by Barnard S. Proctor, who, for some years past, has given attention to metrology. In the course of his remarks on the various propositions which have been brought forward, this gentleman takes occasion to speak of Mr. Alfred B. Taylor's monograph on the same subject, published in the Proceedings of the American Pharmaceutical Association of 1859, in which he brings forward a new octonary system, embracing every form of measurement, in the following terms:—

“The proposition of the American Pharmaceutical Association, unquestionably the most carefully considered, the most elaborate, and most ambitious of the proposed plans, is based on the belief, and, I think, I may say, the well-grounded belief, that for all practical purposes counting by eights has the greatest sum of advantages.”

We believe “the Conference” is really a success, and that its future promises well. The quality of the papers it has produced justify their publication in a separate form, and it is to be hoped that the proceedings of the next meeting will not only be issued in a separate and distinct volume,—the first of a long series,—but that, dropping the modest and initiatory title of “Conference,” this body will adopt some such name as “British Pharmaceutical Association,” representing as it should, and probably to some extent now does, every pharmaceutical interest and society.

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OUR SCHOOL OF PHARMACY.—It is a source of satisfaction that our College is rapidly recovering from the depressing influence exerted on scientific schools generally by the great Rebellion, and promises soon to regain its previous numbers. We append, as usual in our January number, a list of the Class and Preceptors, which this season reaches 106.

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THE PHARMACEUTICAL DEPARTMENT OF THE ARMY.—We have for some time past entertained the idea of publishing in this Journal a record of the prominent facts connected with this branch of the medical service of



the army, and have taken some steps towards its accomplishment. In view of this we should be glad to receive any information bearing upon the subject in their department from the numerous graduates of Pharmacy, who now occupy positions as hospital stewards, medical storekeepers, or any others, where opportunity is afforded to acquire correct information. The idea is, to learn the general plan of conducting the field and hospital service, the amount of accuracy in the measurement of medicines observed in practice in the two branches of the service, and any legitimate information in reference to the general duties of pharmacutists in the army. Also, information in regard to the amount of supplies actually consumed, compared with the amount issued from the public stores and laboratories, and the several amounts of production in these. It is altogether certain, that no such gigantic military pharmaceutical operations have ever been carried on in Europe, as the past three years have witnessed in the supply of the armies of the United States, and we deem it desirable to obtain and preserve a record of the facts as it is proper and right to publish them.

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**POISONING BY BELLADONNA BERRIES.**—In a communication received from Henry F. Geyer, of Mechanicsburg, Pa., dated Dec. 11th, 1863, (and which was accidentally mislaid,) he sends the following slip from the *Cumberland Valley Journal* of the 3d of December, 1863, viz. :

“(SAD OCCURRENCE.—On Sunday night last, Alfred Cookman, an interesting little son of Mr. Benjamin Haverstick, of this place, aged about eight years, died under the following melancholy circumstances: On Friday afternoon, while playing in the vicinity of Mr. Troutwine's garden, in Locust street, he came to a stalk of Nightshade, and, not knowing what it was, ate some of the berries. On the following morning he complained of feeling unwell. Some time after, a physician was summoned, but when he arrived, it was too late to counteract the effects of the deadly poison, and the little sufferer died in great pain.”

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*A Comprehensive Medical Dictionary: Containing the Pronunciation, Etymology and Signification of the terms made use of in Medicine and the Kindred Sciences, with an Appendix, comprising a list of all the more important articles of the Materia Medica arranged according to their medicinal properties. Also, an explanation of the Latin terms and phrases occurring in Anatomy, Pharmacy, &c.; together with the necessary directions for Writing Latin Prescriptions, &c. &c. By J. THOMAS, M.D., &c. Philadelphia. J. B. Lippincott & Co. 1864. pp. 704.*

In glancing over the title page of Dr. Thomas' Dictionary, one is struck with the extent of its grasp, and the valuable aid it promises to the student who may habitually consult its pages. Perhaps in no country will so great a diversity in the pronunciation of scientific terms be observed as in our own, where self-education is more common than in most others, and

University tuition less accessible. Our Medical and Pharmaceutical Institutions do not insist on preparatory classical studies, and the student is often found entering upon a professional career with an amount of preliminary education wholly inadequate to cope with the difficulties that beset him. To this numerous class, both as students and graduates, this work offers its aid; and, if its claims be at all commensurate with its promises, they will find it a constant helper on many needful occasions. Now, what does it promise? and how nearly does it come up to the mark? First, in regard to pronunciation. Dr. Thomas is the author of the system of pronunciation in "Lippincott's Gazetteer," and has given much attention to this important feature of the work. His plan, in most instances, divides the words into syllables by hyphens, and in this way, with accentuation marks, gives a good idea of the pronunciation intended; in others, a separate and distinct spelling, to represent the sounds of the word, is given, thus:—"Artemisia," is "Ar-te-mish'e-a;" "Chenopodiaceæ," is "Ke-no-po-de-á-she-é;" "Discutient," is "Dis-kú-shent."

The etymology of words derived from the French, Latin and Greek is very generally traced, and affords a convenient reference for writers and investigators. Besides the proper words employed in scientific nomenclature and terminology, an immense number of adjectives explanatory of the sciences are introduced and defined; more especially those used in medicine, pharmacy and botany. The pharmaceutical student will be particularly gratified and benefited by the light it sheds on his scientific pathway. The natural orders of plants are all given and defined, and also most articles of the *materia medica*.

In the Appendix, the explanation of Latin terms and phrases will meet a want felt in every apothecary's shop and physician's office, and the tabular statements of Latin names and adjectives there grouped, with especial reference to medicine and pharmacy, exhibit a happy familiarity on the part of the author with these wants.

In this part will also be found a useful "table of *materia medica*," arranged according to the therapeutic qualities of the drugs; and also a table of doses, both of which address themselves specially to the medical student.

The chapter on writing prescriptions may be studied by medical students with much advantage, and attention to the precepts it inculcates, by many physicians, would render these often obscure and hieroglyphic documents clear and easily understood. Of course the remarks bear more on the language than the composition of prescriptions, and do not embrace the numerous hints necessary to caution against chemical incompatibility or pharmaceutical impropriety, which a complete treatise on this branch of medical education would include.

The author, at the conclusion, gives a chapter of words, the pronunciation of which is disputed, with the several authorities for the variations.

In thus presenting some of the merits of Dr. Thomas's book, we heartily recommend it as a valuable handbook and lexicon, for constant reference by the physician and pharmacist.

In the course of our examination we have met with a few omissions and errors, which are difficult to avoid in a first edition of such a work. In several instances reference is made to other words which have not been introduced: thus, *Abrotanum mas*, is referred to *Artemisia Abrotanum*; *Black Drop* is referred to *Opii Acetum*; *Abscissa vox* is referred for definition to *Vox abscissa*; *Acaweria* to *Ophioxylum*; *Alcargen* to *Cacodylic acid*,—none of which are to be found. The definition of the term "*Liquor*" is not pharmacopœially correct, as, in their true signification, alcohol does not enter the "*Liquores*" of the U. S. Pharmacopœia. Goulard's Extract is defined *Liquor Plumbi Diacetatus dilutus*. *Nicotina*, the poisonous alkaloid of tobacco, is said to be "the same as *Nicotianin*," which last is described to be the odorous principle of tobacco. "*Percolation*" is not noticed as a pharmaceutical process equivalent to "displacement," and "*dialysis*," in its new chemical sense as a process nearly equivalent to *exosmosis*, has been overlooked.

These omissions and errors will doubtless be corrected in a future edition.

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#### OBITUARIES.

Prof. BENJAMIN SILLIMAN, of Yale College, died at his residence in the city of New Haven on the morning of Nov. 24, 1864, in the 86th year of his age. He was the son of General Gold S. Silliman, of a highly respectable Connecticut family, and was born in the town of Trumbull, Conn., in 1779; graduated at Yale College, 1796;—tutor in that institution 1799—1804, when he became Professor of Chemistry; in which station he continued until 1853, nearly fifty years, and then retired from the active duties of the Chair to become Emeritus Professor. In 1818 he founded the *American Journal of Science and Arts*, which he sustained alone for twenty years in the most liberal manner, at a great outlay of money, care and labor for a whole generation. Prof. Silliman was more widely known in Europe than any other American in the walks of science. "Amid all his engagements he forgot nothing, he neglected nothing, he was never in a hurry, and never shrank from duty. The whole working of his nature was so regulated and even, that it surprised no one to see him maintain himself unchanged at the age of four score." "In bodily presence and mental characteristics he was a perfect model of manhood. All his faculties were well balanced, and always in order for use. He was never taken by surprise, or thrown off his balance by any casualty. He was the most attractive lecturer in the country, from the amenity of his manner, the fluency of his diction, the clearness of his instruction, the aptness of his topics and the beauty of his experiments. When he entered upon his career, the science of chemistry had but just assumed its form, mineralogy was in a crude state as an appendix to chemistry, and geology was hardly thought of as a science. In the wonderful advances made since,

he has always kept himself abreast of the foremost in his intimate and accurate knowledge of every new discovery." "His position as the most widely known American, with his personal attractiveness, made his company and correspondence to be sought by many admirers in both hemispheres. Having a tolerable patrimony, he was able to exercise a liberal and graceful hospitality, and hundreds will remember the hours spent in his house as among the brightest oases of life."—*N. Y. Independent*.

Prof. Silliman mingled in the reunions of the last College commencement in July with his usual vivacity and amenity, but the last five years had told on the firmness of his step and his power of endurance. He was somewhat unwell a week or two before his decease, but awoke on the morning of his death, from a refreshing sleep, and soon after performing his usual morning devotion, he quickly asked his wife to raise his head, and was dead almost in an instant after. "Thus ended most fittingly a beautiful life. The model organism, so balanced in all its parts, and so true and regulated in its movements, had run its full time—and stopped."

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FREDERICK L. JOHN, one of the most able and successful pharmacutists of Philadelphia, died on the 11th of December, 1864, in the fifty-fourth year of his age. Mr. John was born at Gehoven, in Prussia, on the 10th of April, 1811, and emigrated to this country in January, 1842. In 1844 he commenced business in Race street, on the site of his present establishment, and long before his decease had acquired a well deserved reputation as a practitioner of pharmacy. His application to business, in the earlier part of his career, was unremitting; especially was he devoted to the laboratory duties, which he superintended in person, and took great pride in having thoroughly done. Mr. John was regularly educated in Prussia as a pharmacutist, and during his residence here cultivated an acquaintance with American botany. Among the medical profession, Mr. John had many friends, and stood deservedly high. He was a member of the Philadelphia College of Pharmacy and of the American Pharmaceutical Association, and sometimes attended the meetings. Mr. John was retiring and unassuming in his demeanor, possessed great integrity of character, and was charitable in his relations with the needy. Our intercourse with him has always been favorable to his excellence as a man, to his thoroughness as a pharmacutist, and to his liberality as a votary of science.



## Catalogue of the Class of the Philadelphia College of Pharmacy.

FOR THE FORTY-FOURTH SESSION, 1864-65.

*With a List of their Preceptors and Localities.*

MATRICULANTS.	TOWN OR COUNTY.	STATE.	PRECEPTOR.
Allen, Wm. E.	Philadelphia,	Pennsylvania,	Charles Ellis, Son & Co.
Austin, George	Terre Haute,	Indiana,	Thomas H. Barr.
Barnitz, Frank M.	York,	Pennsylvania,	W. B. Webb.
Bauer, Louis G.		Germany,	Oscar De Dobbeler.
Becker, G. H.	New Strelitz,	"	Of. Med. Direct. U. S. A.
Black, John, Jr.	Lancaster,	Pennsylvania,	C. A. Heinitsh.
Blair, Andrew	Philadelphia,	"	Andrew Blair.
Blair, Henry C.	"	"	Andrew Blair.
Braddock, Isaac A.	Haddonfield,	New Jersey,	C. S. Braddock.
Blomer, Augustus P.	Philadelphia,	Pennsylvania,	Wm. M. Reilly.
Brown, Samuel A.	"	"	J. R. Angney, M. D.
Brown, Thomas J.	Rockdale,	"	James T. Shinn.
Buchanan, Joseph Y.	Glasgow,	Scotland,	Andrew Blair.
Campbell, Hugh	Philadelphia,	Pennsylvania,	J. W. Simes, Jr.
Clarke, Thomas C., Jr.	"	"	Philadelphia Navy Yard.
Cornell, Edward A.	Williamsport,	"	Charles Ellis, Son & Co.
Cuthbert, Richard W.	Athensville,	"	O. S. Hubbell.
Day, Robert L.	Somerville,	New Jersey,	T. R. Coombe.
De Moll, Otto	Washington,	Dist. of Columbia,	C. F. Gristock.
De Young, Samuel H. S.	Philadelphia,	Pennsylvania,	Jos. Landschultz.
Ditman, Andrew J.	"	"	Peter Niskey.
Dobbins, Albert N.		New Jersey,	J. P. Thatcher.
Edwards, Wm. F.	Dover,	Delaware,	J. H. Kay.
Evans, J. Estell	May's Landing,	New Jersey,	French, Richards & Co.
Evans, Jonathan	Philadelphia,	Pennsylvania,	Charles Ellis, Son & Co.
Fergusson, John	Ary,	Scotland,	Powers & Weightman.
Furness, Thomas S.	Philadelphia,	Pennsylvania,	Ambrose Smith.
Gross, George A.	Harrisburg,	"	Thomas S. Wiegand.
Harry, J. W.	Conshohocken,	"	D. W. Harry.
Hays, Nathan W. C.	Burlington,	New Jersey,	Daniel S. Jones.
Heller, Marx M.	Cleveland,	Ohio,	Thomas J. Husband.
Hillary, John F.	Philadelphia,	Pennsylvania,	Wm. Hillary.
Huber, Milton	Norristown,	"	Wm. Stahler.
Johnson, Newton A.	Galesburg,	Illinois,	B. Smedley.
Jones, Samuel R.	Pittsburg,	Pennsylvania,	S. M. McCollin.
Keen, Francis	Philadelphia,	"	I. N. Marks.
Kennedy, Charles W.	"	"	Edmund Pollitt.
Kneeshaw, Wm. W.	Trenton,	New Jersey,	Hassard & Co.
Laird, Wm. R.	Reading,	Pennsylvania,	A. B. Taylor.
Loughlin, James	Philadelphia,	"	Edward Parrish.
Leeds, J. Elwood	"	"	Jenks & Middleton.
Levering, P. Wharton	Roxborough,	"	O. S. Hubbell.
Lindsay, J. B.	Philadelphia,	"	F. Brown.
Lippincott, Robert C.	"	"	R. Shoemaker & Co.
Little, Arthur H.	"	"	Bullock and Crenshaw.
McClure, Francis	Harrisburg,	"	John Reakirt.
McElroy, James B.	Philadelphia,	"	G. Krause.



McPike, Wm. C.	Alton,	Illinois,	W. A. Holton & Co.
Mein, Bernard V.	Philadelphia,	Pennsylvania,	T. Morris Perot.
Meyer, John P.	Pottsville,	"	Joseph A. Heintzleman.
Millemann, Phillip	Chicago,	Illinois,	Charles H. Eggert.
Miller, Abraham M.	Philadelphia,	Pennsylvania,	Thomas S. Wiegand.
Milliac, John	"	"	W. Patterson, M. D.
Moore, Charles C.	"	"	Bullock & Crenshaw.
Morell, Elijah S.	"	"	Charles Morell.
Moser, Americus H.	Allentown,	"	E. B. Garrigues.
Newbold, Henry A.	Philadelphia,	"	Powers & Weightman.
Newbold, Thomas M.	"	"	French, Richards & Co.
Newton, John S.	"	"	Ralph Newton.
Nordell, Augustus	Rock Island,	Illinois,	Daniel Hershey, M. D.
Notson, Charles B.	Philadelphia,	Pennsylvania,	Wm. Notson, M. D.
Orth, Frederick C.	Hummelstown,	"	Philip Leidy.
Painter, Emlen	Delaware Co.,	"	Charles Shivers.
Pragheimer, A. E.	Philadelphia,	"	H. O. D. Banks & Co.
Parrish, Clemmons	"	"	Edward Parrish.
Pile, Gustavus	"	"	Wilson H. Pile, M. D.
Preston, David	Harford Co.,	Maryland,	Wm. Procter, Jr.
Price, J. M.	Philadelphia,	Pennsylvania,	C. Fronefield, M. D.
Price, Warren D.	"	"	Thomas Lancaster.
Ranck, J. W.	"	"	N. Ranck, M. D.
Rau, Robert	Bethlehem,	"	J. M. Maris.
Reakirt, Tryon	Philadelphia,	"	John Reakirt.
Remington, Joseph P.	"	"	Charles Ellis, Son & Co.
Riley, Charles W.	"	"	George A. Miller.
Rinker, Wm. H.	Roxborough,	"	John Moffet.
Robinson, Joshua K.	Newark,	Delaware,	O. S. Hubbell.
Ross, H. H.	Chester,	Pennsylvania,	M. Marshall, M. D.
Rubincam, Charles E.	Philadelphia,	"	Jenks & Middleton.
Rutherford, Charles	"	"	David Jameson.
Sayre, Lucius E.	Bridgeton,	New Jersey,	W. Opdyke, M. D.
Segner, William	Palmyra,	Pennsylvania,	J. P. Fetter, M. D.
Senderling, Charles	Philadelphia,	"	Joseph L. Shoemaker.
Shoemaker, Allen	"	"	R. Shoemaker & Co.
Shoemaker, B., Jr.	"	"	R. Shoemaker & Co.
Shoemaker, Charles	"	"	Edward Parrish.
Shoemaker, Wm. H.	Muncy,	"	Hassard & Co.
Simson, W. H.	Halifax,	Nova Scotia,	George Y. Shoemaker.
Smith, Wilson B.	Philadelphia,	Pennsylvania,	W. H. H. Githens.
Stadelman, S. F.	"	"	George Ashmead.
Stolte, Max Joseph	"	"	A. B. Taylor.
Strehl, Louis	Chicago,	Illinois,	John Bley.
Souder, Joseph A.	Philadelphia,	Pennsylvania,	W. R. Warner.
Taylor, James	"	"	James L. Bispham.
Van Orsdel, Wm. E.	N. Wilmington,	"	W. E. Van Orsdel.
Vogelbach, Edmund	Philadelphia,	"	Michael Kreitzer, M. D.
Walker, John Thomas	"	"	Jn. M. Meis, Jr.
Walker, Thomas A.	"	"	Robert C. Davis.
Webb, Samuel	"	New Jersey,	Elliot. White & Co.
Weber, Frank	Philadelphia,	Pennsylvania,	J. Weber, M. D.
Weichselbaum, Jacob	"	"	Smith & Shoemaker.
Wendell, Edward	"	"	John G. Baker.
Wendell, Frederick	"	"	John Wendell, Jr.
White, James	"	"	Wyeth & Bro.
Williamson, Forest F.	Delaware Co.,	"	A. H. Yarnall.

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MARCH, 1865.  
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ON A NEW PROCESS FOR MAKING CONCENTRATED  
FLUID EXTRACTS.

BY N. SPENCER THOMAS.

*Mr. Editor*,—Having been several years engaged in making fluid extracts of that class representing pound by pound\* the crude drug, on a large scale for the trade, and always on the alert for the best process, and finding extracts prepared in “vacuo” much approved—and justly so, too, as compared with any other process then known—I adopted that plan as the best for evaporating, and found, after close observation of its working for a long time, that it was perfection for making solid extracts; but even with it, there was an imperfection in the preparation of fluid extracts. This imperfection or defect seemed at first to be insurmountable, as the difficulty was not in the mode of evaporation, but in the operation itself. Where there is any mixture of menstrua of different volatility, as alcohol and water, the difficulty that presents itself is simply this: the first part of the process for making a fluid extract is making an alcoholic tincture with alcohol more or less strong, according to the nature of the drug. The next step is to evaporate or distil, and as we can thus avoid over a hundred degrees of heat, we introduce the tincture into the vacuum-pan and proceed; the alcohol being most volatile, evaporates or distils off first, leaving the desired measure of fluid extract without alcohol, or very little, if any—it being in fact an aqueous solution, or mixture of an aqueous solution with various precipitates which would require alcohol to be held in solution, varying according to

[\*The author probably intends “pound to pint,” or ounce to fluid-ounce. Grain to minim is the correct expression.—ED. A. J. PH.]

the nature of the drug started with in the process. The next step is to filter out all or a great part that is valuable, and sell or dispense the aqueous solution under the impression that it is a good preparation.\* This mode of proceeding has been somewhat improved on by retaining the first running of tincture, to mix with an aqueous solution obtained by continuing the displacing and distilling all the alcohol off. The result of this mixture, in most cases, is a double precipitation, sometimes followed by a *partial* re-solution, leaving the operator in a quandary whether to filter and have a preparation presenting a handsome appearance, or not filter, and have a less handsome but really better one.

In casting about for a perfect process for making these most desirable preparations, a plan was adopted and pursued for a time, of making all extracts into the pilular consistence, keeping memoranda of yield in percentage, and using these solid extracts for making the fluid extracts by solution in menstrua of the proper strength for holding all the medical virtues in solution, using whatever amount of extract obtained from a pound of crude drug to make a pound of fluid extract. This plan was found to make a good fluid extract, and to have some advantages. Using my own vacuum extracts, and always knowing the exact strength of the same, I had full faith that I had as good fluid extracts as could be made by any other known process, and fully reliable as regards amount of drug represented by each pound. But it involved two processes for one preparation, and the plan was abandoned in favor of the process for which I have obtained a patent. This process I believe to be perfection in every respect; and as it covers pretty broad ground, I doubt its ever being equalled by any other plan. It has none of the faults that had always to be contended with; and which I considered insurmountable until this discovery was made, which was somewhat in the following manner. It suggested itself in thinking of the manufacture of linseed oil, in which violent pressure is used.

\* This statement, in reference to the value of the precipitated matter, conveys a false impression, as it could be true of only a limited number of substances. If it was the author's practice in all cases not to add the necessary proportion of alcohol, his preparations must have suffered. It certainly was not the usual practice.—ED. AM. JOUR. PHARM.

The fluid in that case existing naturally in the substance; in this case it has to be added in the shape of the proper solvent. This solvent is added part at a time, and it is necessary that it should be so regulated in strength, alcoholically, as to be capable of dissolving out, as well as holding in solution, all the medicinal substances existing in the crude drug; it is believed the same strength of solvent is required to accomplish both objects. The operation is a simple one, but requires an expensive press and considerable skill to carry it out properly. The drug is ground to proper fineness in such a manner as to avoid fine dust or the necessity of sifting out fine dust, as it is apt to contain the most valuable parts of the drug. This can be done best in a mill of the description for several years sold by me to the trade, and now sold by Mr. Charles T. Iredell, of Bristol, Pa. The fineness must necessarily be regulated by the nature of the substance—harsh substances can be ground finer than those of a soft nature. After being ground, the drug is moistened or dampened with part of the solvent, which for any particular lot in progress, must always be of same strength. After being allowed to stand in a closed vessel for a short time, it is submitted to a powerful pressure. This operation of moistening and pressing is repeated several times, with liquid or solvent always of same strength, until the same amount of liquid is obtained that there was of the drug after being ground. When sufficient liquid is obtained, nothing further is necessary but to mix and filter. As heat and evaporation and long exposure to atmospheric air are all avoided, and if the moistening and pressing are properly done the drug is entirely exhausted, it must be apparent that we have a preparation by this process that is perfection itself. Its superiority over any process hitherto known must be apparent; as in avoiding heat, we avoid the changes that all substances are subject to by cooking; in avoiding evaporation, we avoid the changes in strength of solvent, and consequent precipitation of substances more or less valuable; and in avoiding exposure to atmospheric air, we avoid all chance of oxidation and evaporation and their consequences.

On examination of preparations of substances of a fragrant nature made by this process—for instance, fluid extracts of



Buchu and of Sassafras Bark,—they will be found to be very much superior to those made by any other process; having all their aroma and fragrantcy, and in fact having a freshness that cannot possibly be obtained in any other way. The almost entire tastelessness of the refuse of powerful substances, such as Jamaica Ginger, after being submitted to this process, is considered satisfactory proof of the capabilities of the process. The novelty and consequent patentability of this process was shown by the prompt allowing of the Patent, as soon as it was presented to the Patent Office. Annexed is a copy of the Patent. From close observation of the workings of this process, it is believed that the great pressure used has effects that would not at first be supposed. The small amount of liquid is, of course, at first application, perfectly saturated with soluble substance, if there be enough to saturate it; then the pressure has the effect of pushing the liquid from the centre of the mass past the other particles, or through them giving greater chance for solution. The liquid obtained by first pressing is very strong, becoming weaker at each succeeding pressing, until exhaustion is complete or nearly perfect. By noting the amount of liquid put on and taken off at each pressing, if the solvent is the proper one, the amount of valuable substance remaining, though very small, can be ascertained with mathematical certainty. For instance, if a lot has six pressings, taking out two-thirds of the strength in it at commencement of each pressing, the sixth pressing will leave in fourteen one-hundredths of one per cent. of substance in it at the commencement of the operation, soluble in the liquid used. If same number of pressings are given, each taking out one-half, the last pressing will leave in one and nine-sixteenths of one per cent. of original amount of substance soluble in the liquid used. Persons wishing to avail themselves of the use of this Patent, on liberal terms, will please address the Patentee.

N. SPENCER THOMAS,  
*Painted-Post, Steuben County, N. Y.*

These Extracts (as well as the Mills) are now made and sold by Mr. Charles T. Iredell, Bristol, Bucks County, Pa., twenty miles from Philadelphia.

*The United States of America, to all whom these Letters Patent shall come.*

Whereas, N. Spencer Thomas, of Painted-Post, New York, has alleged that he has invented a new and useful improved process for making Concentrated Fluid Extracts, which he states has not been known or used before his application—has made affirmation that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said Invention, and that the same hath not, to the best of his knowledge and belief, been previously known or used. Has paid into the Treasury of the United States the sum of Thirty-five dollars; and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said Invention, and praying that a Patent may be granted for that purpose. These are, therefore, to grant according to law to the said N. Spencer Thomas, his heirs, administrators, or assigns, for the term of Seventeen Years from the Thirty-first Day of January, One Thousand Eight Hundred and Sixty-five, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said Invention—a description whereof is given in the words of the said N. Spencer Thomas, in the Schedule hereunto annexed, and is made a part of these presents.

In testimony whereof, I have caused these Letters to be made Patent, and the Seal of the Patent Office has been hereunto affixed. Given under my hand, at the City of Washington, this thirty-first day of January, in the year of our Lord one thousand eight hundred and sixty-five, and of the Independence of the United States of America the eighty-ninth

(Copy.)

{ Seal of the  
Patent Office. }

J. P. USHER,  
*Secretary of the Interior.*

Countersigned and sealed with the }  
Seal of the Patent Office. }

D. P. HOLLOWAY, *Commissioner of Patents.*

*The Schedule referred to in these Letters Patent, and making part of the same.*

To all to whom it may concern:—Be it known, that I, N. Spencer Thomas, of Painted Post, in the County of Steuben, and State of New York, have invented a new and improved Process for making Concentrated Fluid Extracts, and I do hereby declare that the following is a full, clear, and exact description of the same. This invention relates to an improved Process for producing that class of Extracts which are

made so that a certain amount of Liquid shall represent, pound by pound, medically the same quantity of crude Drug, and which are generally obtained by extracting with a large excess of liquid and evaporating down to the desired strength. The disadvantages of the old process are well known to every chemist. The menstrua used for making extracts are usually of an etherial or volatile nature—such as alcohol of various strength—and their strength changes by evaporation as they are exposed for a longer or shorter period to the open atmosphere. If such menstruum is poured over a certain drug, it dissolves and extracts more or less of the soluble parts of the same according to its strength; but if the same liquid has to be poured repeatedly over the same drug, it loses its strength alcoholically, and some of those portions first dissolved are precipitated, and an imperfect extract is the result. The value of the extract being determined by its alcoholic strength when finished, the same or similar reasons render it objectionable, to subject the extract, when first obtained, to the evaporating process; for by this process, the volatile or spirituous parts of the menstruum are first evaporated, and the weaker liquid is not capable to keep in solution many of those parts of the drug which originally had been dissolved in the extract.

These objections are obviated by my process, which is carried out in the following manner: I first weigh off a quantity of drug, and the same quantity, or more by weight, of the menstruum or liquid by means of which the extract is to be made. A little more of the menstruum being required, as a little moisture is left in at last pressing. The drug being ground to proper fineness, is then dampened with a small portion of the liquid and subjected to heavy pressure (say from 800 to 1000 tons), whereby all the liquid, or nearly so, together with such parts of the drug which have dissolved in the same, is expressed. A fresh portion of the liquid is then sprinkled over the drug; a little time being allowed for the liquid to dissolve the soluble parts of the drug, and the same process of pressing repeated until the whole quantity of liquid is used up and the drug is completely exhausted, and the required measure obtained. By this process, an extract is obtained which represents, pound by pound, the crude drug. The drug is perfectly extracted, and the menstruum preserves its original strength throughout, so that the same is capable to retain in solution all those parts which are dissolved during the various stages of the process. Furthermore, by my process, the tedious and expensive process of evaporation is dispensed with, and concentrated fluid extracts of any description can be produced cheaper and better than by any process heretofore applied; and as the application of heat is entirely avoided, the preparation does not receive the injury by heat that all such preparations are liable to, if heat is applied to them, no matter how carefully applied or moderate the degree of temperature; and furthermore, the change thereby of strength of solvent is avoided.

What I claim as new and desire to secure by Letters Patent, is the



within described Process of producing Concentrated Fluid Extracts, by bringing the crude drug gradually in contact with the desired measure of Liquid to be represented by the extract, and exposing it after each application of liquid, to a heavy pressure—substantially as set forth; whereby extracts of uniform strength can be made, and both heat and evaporation avoided.

N. SPENCER THOMAS.

*Witnesses.*

C. F. Platt, A. J. Banter.

[NOTE.—The process of Mr. Thomas noticed above, merits the careful attention of our Colleges of Pharmacy, as guardians of the interests of medicine and pharmacy. If the claims made for the process are *true*, *within practicable limits*, we esteem it of great value, for the reasons given in the paper by the author; but if it be *not true*,—or at least *not true in practice*—that a drug may be thus exhausted of its valuable medicinal constituents, measures should be taken by our Colleges to prevent the innovation from being recognized as a proper and efficient method; at least so far as relates to the official fluid extracts. It is the interest of the inventor, therefore, to submit his process as early as practicable to a committee of pharmacutists, that its claims may be tested. Mr. Thomas is a graduate in Pharmacy, and has had considerable practical experience in making pharmaceutical preparations.—ED. AM. JOUR. PHARM.]

## U. S. ARMY MEDICAL STOREKEEPERS.

By HENRY N. RITTENHOUSE, U. S. A. M. S., AT CINCINNATI, O.

The law creating the above officers was approved May 20th, 1862; its provisions are:—

“That the Secretary of War be authorized to add to the Medical Department of the Army, Medical Storekeepers, not exceeding six in number, who shall have the pay and emoluments of Military Storekeepers of the Quartermaster’s Department, who shall be skilled Apothecaries or Druggists; who shall give the bond and security required by existing laws for military storekeepers in the Quartermaster’s Department, and who shall be stationed at such points as the necessities of the army may require.

*Provided*—That the provisions of this Act shall remain in force only during the continuance of the present rebellion.”

And chapter No. 201, Military Laws U. S., Section 16th, approved July 17, 1862, provides—

“That Medical Purveyors and Storekeepers shall give bonds in such



sums as the Secretary of War may require, with security to be approved by him."

General Order No. 55, War Department, Adjutant General's Office, Washington, May 24th, 1862, announced the following regulations, which governed the appointment of Medical Storekeepers :

1st. A board of not less than three Medical Officers will be assembled by the Secretary of War to examine such applicants as may, by him, be authorized to appear before it.

2d. Candidates, to be eligible to examination, shall not be less than 25 years or more than 40 years of age; shall possess sufficient physical ability to perform their duties satisfactorily; and shall present with their applications satisfactory evidence of good moral character.

3d. Candidates will be required to pass a satisfactory examination in the ordinary branches of a good English education, in Pharmacy and Materia Medica; and to give proof that they possess the requisite business qualifications for the position.

4th. The board will report to the Secretary of War the relative merit of the candidates examined, and they will receive appointments accordingly.

5th. When appointed, each medical storekeeper will be required to give a bond in the sum of \$40,000, before he shall be allowed to enter on the performance of his duties.

After having complied with all the requirements of the above order, the successful candidates were duly appointed by the President, and commissioned accordingly.

The duties of the position are defined to be "under the direction of the Surgeon General and Medical Purveyors, with the storing and safe keeping of medical and hospital supplies, and with the duties of receiving, issuing and accounting for the same according to regulations."

The pay of the Storekeepers is \$124.16 per month, with the allowances of quarters and fuel of a first lieutenant of the army, in kind only, which added to the pay, at the present market value, makes the total yearly pay about \$1,750 (dollars).

There is no actual rank for storekeepers; by custom and courtesy those in the quartermaster's and ordnance departments are styled Captain, and the same title is at some posts adopted for medical storekeepers; at others they are simply addressed as "Mr.;" according as custom has established. The absence of any rank is a practical inconvenience, as no civilian in the army can com-

mand that subordination and respect from inferiors which attaches to actual and acknowledged rank in a superior.

A uniform has been established by regulations for storekeepers in the department to which they belong, but practically no attention is paid to it, each one wearing what fancy or convenience dictates, without any mark of rank, however.

Having no assimilated rank, they are not in the line of promotion; nor are they or their families entitled to any pensions or bounties under existing laws, should they be injured or killed, or die from disease contracted while in the line of their duty; the position being considered rather a civil than a military addition to the army.

The position of storekeeper is one of considerable magnitude and responsibility, the property passing through his hands, and for which he is accountable while in his care, amounts to millions of dollars annually.

The law requires him to receive, issue, and safely store it; he must keep an account with each item, and make returns quarterly, accounting for every ounce or yard or single thing that comes into his possession, and he must be sure, too, that he receives all he is charged with, by looking sharply after those who may be furnishing his depot with supplies; this for his own protection as well as for the Government.

Enough clerical assistance is allowed to perform the great amount of labor necessarily accumulating; system and economy are, however, rigidly enjoined, and no unnecessary expenses of any kind are allowed in the settlement of accounts with the Treasury. As he is responsible for the stores passing through or in his hands, he is also responsible for the honesty and efficiency of those employed by him, and can therefore appoint his own clerks.

When a requisition is received from a Surgeon in charge of a hospital, or of a regiment in the field, having first obtained the approval of the Medical Director of the Department in which it is located, it is at once packed—all the supplies being conveniently put up for issue according to the Supply Table—and marked ready for shipment, each package also being marked with the name of the class to which its contents belong. A packer's list, giving in detail the contents of each package, is sent by mail,

together with an invoice and blank receipt, to be filled up similar to the invoice and returned by the receiving officer.

The requisition, when thus ready for shipment, is sent to the quartermaster of the post, for transportation, who receipts to the storekeeper for the number of packages and their condition only; this relieves him from further responsibility as to the safety of the goods, and the quartermaster sees that they are properly delivered to the person making the requisition.

It so happened that four of the six medical storekeepers appointed as above authorized, were assigned to duty as Acting Medical Purveyors; this added largely to their duties and responsibilities; as they then became purchasing and disbursing officers, purchasing supplies in yearly value from half to two millions of dollars, and paying to the various claimants against the Army Medical Department, perhaps as much more, but with no extra compensation or emolument. The amount of pay seems small for such responsibilities and the heavy security demanded, and in reality is so, but when compared with that of officers in other departments whose duties are similar, it is equally good.

Scientific knowledge is not much called into play; what is most required is a thorough business knowledge, a familiarity with the various customs of ordinary business transactions, sound judgment, and intimate acquaintance with the regulations, laws, orders, and circulars of the medical department.

The purchase of medicines proper is a small part of the expenditures of the medical department, when compared to the purchase of Dry Goods, Hardware, Groceries, Liquors, Books and Stationery, &c., required in supplying hospitals, so that a varied business knowledge is necessary, to keep in view the constant market changes in the price and also in the quality of supplies required. I do not wish to convey the idea that an acquaintance with drugs is unimportant, but which is on the contrary absolutely necessary; hence the wisdom of appointing practical druggists to the positions.

As a new employment of Pharmacutists, called into existance by the rebellion, the history of the medical storekeepers deserves mention in the annals of Pharmacy.\*

\* See remarks in the Editorial department on this subject.



THE MEDICAL PURVEYING DEPARTMENT OF THE  
UNITED STATES ARMY.

BY HENNELL STEVENS, Medical Storekeeper, U. S. A.

The duties and responsibilities of the Medical Department, of an army like that of the United States, engaged in a conflict so vast, and scattered over so large an extent of territory, must necessarily be varied and important. In point of numbers it is the largest of the Staff Corps. Upon it devolve the measures necessary for the prevention of disease, as well as its treatment and cure; the hygienic and sanitary regulations of the army; the planning of hospitals, and their superintendence; the purchase or manufacture, and distribution of medical supplies, as well as their administration to the sick. It is of the last class of duties alone of which I shall treat in the present paper, in which I propose to give some account of the operations of the Medical Purveying Department of the United States Army, believing it will be of interest to the readers of the Journal.

The duties of procuring and issuing the medical supplies of the army are devolved, under the direction of the Surgeon General, upon the Medical Purveyors, who are Medical Officers, detailed for that duty, there being, in our army, no officers appointed for that specific purpose. In May, 1862, Congress passed an Act, adding six Medical Storekeepers to the army, who were required to be skilled Apothecaries or Druggists; and who were appointed under the following regulations, published May 24th, 1862.

1st. A board of not less than three Medical Officers will be assembled by the Secretary of War to examine such applicants as may, by him, be authorized to appear before it.

2d. Candidates, to be eligible to examination, shall be not less than 25 years nor more than 40 years of age; shall possess sufficient physical ability to perform their duties satisfactorily; and shall present with their applications satisfactory evidence of good moral character.

3d. Candidates will be required to pass a satisfactory examination in the ordinary branches of a good English education, in Pharmacy and Materia Medica; and to give proof that they possess the requisite business qualifications for the position.

4th. The board will report to the Secretary of War the relative merits of the candidates examined, and they will receive appointments accordingly.



5th. When appointed, each Medical Storekeeper will be required to give a bond in the amount of \$40,000, before he shall be allowed to enter on the performance of his duties.

Soon after their appointment, four of the Medical Storekeepers were assigned to duty as Medical Purveyors, and two of them still occupy that position, out of the five remaining in the corps. The relative duties of Medical Purveyors and Storekeepers will appear from the following extracts from official orders.

"Medical Purveyors are charged, under the direction of the Surgeon General, with the selection and purchase of all medical and hospital supplies for the Army. In all cases of emergency they may provide such additional accommodation for the sick and wounded of the Army, and may transport such medical and hospital supplies, as circumstances may render necessary. In all *cases of emergency* they shall promptly issue supplies on special requisitions made directly upon them, and such special requisitions shall consist simply of a list of the articles and quantities required, and be dated and signed by the Medical Officer who makes the requisition. The nature of the emergency must be stated, otherwise the requisition will be referred to the Medical Director.

Except in the "cases of emergency," referred to in the preceding paragraph, Medical Purveyors and Medical Storekeepers will issue medical and hospital supplies only on the order of the Surgeon General, the Assistant Surgeon General, or a Medical Director.

Medical Storekeepers are charged, under the direction of the Surgeon General and Medical Purveyors, with the storing and safe-keeping of medical and hospital supplies, and with the duties of receiving, issuing, and accounting for the same, according to regulations.

Medical Purveyors and Medical Storekeepers will be held responsible that the medical and hospital supplies issued or transferred by them, are well packed; that each article is designated by the name of the maker or vender; and that each package is legibly and correctly marked with the address of the officer for whom it is intended, and with its weight and contents, whether medicines, hospital stores, instruments, dressings, books and stationery, bedding, clothing, or furniture and appliances.

Medical Purveyors and Medical Storekeepers will give bonds in such sums as the Secretary of War may require, with security to be approved by him. Medical Officers, temporarily assigned to duty as Acting Medical Purveyors, are not required to give bonds."

Besides procuring and issuing medical supplies, Medical Purveyors are disbursing officers; being charged with the payment of accounts against the Medical Department, and also of contract Surgeons, and the civilians employed in hospitals as cooks and nurses. The principal purveying depots of the army are located

in New York and Philadelphia, each depot having connected with it a laboratory, where, as far as possible, the supplies required are manufactured, and put up for issue. The other depots are divided into Department and Field depots; the former being located at the most central point of each military department, the latter being in close proximity to the scene of active operations; and drawing their supplies from the former, who, in their turn, are supplied from the principal depots. Like every thing else connected with the army, its medical supplies are on the most liberal scale.

"The standard of medical and hospital supplies for the Army is the Supply Table. It is not the design of the Department to confine medical officers absolutely to that table, either in variety or quantity, but only to establish a standard for their guidance in making requisitions for supplies, leaving individual preferences to be indulged at the discretion of the Medical Director or the Surgeon General. Neither is it supposed that the quantities of the table will always meet the necessities of unusual emergencies, as during epidemics, or in unhealthy seasons and localities; and medical officers who allow their supplies to be exhausted through any such contingencies, without timely notice of their approaching necessities, will be held to a strict accountability."

The Supply Table is as follows:—

STANDARD SUPPLY TABLE FOR THREE MONTHS.

(1.) *For Hospital of 100 Beds.*

(2.) *For 1000 men in the field.*

ARTICLES.	Quantities.		ARTICLES.	Quantities.	
	1.	2.		1.	2.
<i>Materia Medica.</i>					
Acaciæ Pulvis.....oz.	32	8	Ammoniæ Murias.....oz.	8	
Acidum Aceticum.....oz.	8		Spiritus Aromaticus, oz.	4	4
Citricum.....oz.	16		Argenti Nitras.....oz.	2	1
Muriaticum.....oz.	8		Fusa.....oz.	2	1
Nitricum.....oz.	8		Arsenitis Potassæ Liquor.....oz.	4	
Phosphoricum Dilu- tum.....oz.	2		Assafetida.....oz.	4	
Sulphuricum.....oz.	8		Bismuthi Subcarbonas.....oz.	2	
Aromaticum, oz.	16	8	Camphora.....oz.	8	8
Tannicum.....oz.	4	1	Cantharidis Pulvis.....oz.	2	
Tartaricum.....oz.	32		Ceratum.....oz.	24	8
Æther Fortior.....oz.	64	32	Capsici Pulvis.....oz.	8	8
Ætheris Spiritus Compositus oz.	16	16	Catechu.....oz.	8	
Nitrici.....oz.	48	32	Cera Alba.....oz.	32	4
Alcohol Fortius.....bott.	24	6	Ceratum Adipis.....lbs.	10	4
Aloe Pulvis.....oz.	2		Resinæ.....lbs.	2	1
Alumen.....oz.	16	8	Cinchonæ Calisayæ Pulvis.....oz.	16	
Ammoniæ Carbonas.....oz.	16	8	Cinchoniæ Sulphas.....oz.	40	24
Aqua.....oz.	96	32	Chlorinium, (the materials for preparing) in a package no.	1	
			Chloroformum.....oz.	32	32

ARTICLES.	Quantities.		ARTICLES.	Quantities.	
	1.	2.		1.	2.
Collodium..... oz.	2	1	Oleum Morrhuæ..... bott.	10	
Copaiba..... oz.	64	16	Olivæ..... bott.	4	2
Creasotum..... oz.	4	4	Ricini..... bott.	8	4
Creta Preparata..... oz.	16		Terebinthinæ..... bott.	2	1
Cubebæ, Oleo-resina..... oz.	8		Tiglii..... oz.	1	1
Cupri Sulphas..... oz.	2	2	Opil Pulvis..... oz.	8	8
Extract Aconiti Radicis Fluidum..... oz.	8	8	Tinctura..... oz.	16	16
Extract Belladonnæ..... oz.	1	1	Camphorata..... oz.	16	16
Buchu Fluidum..... oz.	16		Pilulæ Camphoræ et Opil..... doz.		8
Cinchonæ Fluidum..... oz.	16	16	Catharticæ Compos..... doz.	8	8
Colchici Sem. Fluidum oz.	8	8	Opil..... doz.		8
Colocyntlid. Compos oz.	8	8	Plumbi Acetas..... oz.	8	8
Conii..... oz.	1		Podophylli Resinæ..... oz.	1	
Ergotæ Fluidum..... oz.	2		Potassæ Acetas..... oz.	8	
Gentianæ Fluidum..... oz.	16		Bicarbonas..... oz.	8	8
Glycyrrhizæ..... oz.	64		Bitartras..... oz.	16	
Hyoscyami..... oz.	1		Chloras..... oz.	16	8
Ipecac. Fluidum..... oz.	8	8	Nitras..... oz.	8	
Nucis Vomicae..... oz.	1		Potassii Iodidum..... oz.	24	8
Pruni Virg. Fluidum..... oz.	8		Quiniæ Sulphas..... oz.	20	10
Rhei Fluidum..... oz.	8	8	Rheum..... oz.	4	
Senegæ Fluidum..... oz.	8	8	Rhei Pulvis..... oz.	4	
Spigeliæ Fluidum..... oz.	8		Sapo..... lbs.	8	8
Valerianæ Fluidum..... oz.	8		Seillæ Pulvis..... oz.	4	2
Veratri Viridis Fluid..... oz.	2		Syrupus..... lbs.	8	4
Zingiberis Fluidum..... oz.	16	16	Sinapis Nigræ Pulvis..... lbs.	6	6
Ferri Chloridi Tinctura..... oz.	16	8	Sodæ Chlorinatæ Liquor..... lbs.	6	1
Iodidi Syrupus..... oz.	16		Bicarbonas..... oz.	16	8
et Quiniæ Citras..... oz.	4	1	Boras..... oz.		8
Persulphatis Liquor..... oz.	4	4	et Potassæ Tartras..... oz.	32	16
Pulvis..... oz.	1	1	Spiritus Lavandulæ Compos..... oz.	16	
Sulphas..... oz.	4		Fru menti..... bott.	72	24
Oxidum Hydratum (the materials for) in p'kg. no.	1		galls.		
Glycyrrhizæ Pulvis..... oz.	8		Vini Gallici..... bott.	12	6
Glycerina..... oz.	16	8	Sulphur..... oz.	16	
Hydrargyri Chlorid. Corr..... oz.	1		Strychniæ..... oz.		1
Chloridum Mite..... oz.	1		Vinum Xericum..... bott.	24	
Iodidum Flavum oz.	1		Zinci Acetas..... oz.	2	
Oxidum Rubrum oz.	1		Carbonas..... oz.	1	
Pilulæ..... oz.	8	8	Chloridi Liquor..... oz.	48	16
Unguentum..... lbs.	1	1	Sulphas..... oz.	2	1
Nitratis, oz.	4	4	<i>Hospital Stores.</i>		
Iodinium..... oz.	4	4	Barley..... lbs.	10	
Ipecacuanhæ Pulvis..... oz.	8	8	Beef, Extract of..... lbs.	24	24
et Opil Pulvis..... oz.	8	8	Candles, Sperm or Compos..... lbs.	2	2
Linum..... lbs.	6	8	Cinnamon, Powdered..... lbs.	1	
Lini Pulvis..... lbs.	16	8	Cocoa or Chocolate..... lbs.	10	
Magnesia..... oz.	8		Coffee, Extract of..... galls.		4
Magnesiæ Sulphas..... lbs.	16	8	Corn Starch..... lbs.	10	
Morphiæ Sulphas..... oz.	1	1	Farina..... lbs.	10	
Olei Menthæ Pip. Tinct..... oz.	1	1	Gelatine Shred..... lbs.	1	
Oleum Cinnamomi..... oz.	16		Ginger, Powdered..... lbs.	1	
			Milk, Concentrated..... lbs.		16



ARTICLES.	Quantities.		ARTICLES.	Quantities.	
	1.	2.		1.	2.
Nutmegs.....lbs.	$\frac{1}{4}$	$\frac{1}{4}$	Napkins for Ophthalmia.....no.	12	
Pepper, Black, Ground.....lbs.	1		Needles 25, cotton 1 spool,		
Porter, in Pint Bottles.....botts.	96		thimble 1, in case.....no.	2	1
Casks.....galls.			Oakum, Fine, Picked.....lbs.	10	5
Sugar, White, Crushed.....lbs.	24	12	Oiled Muslin.....yds.	$2\frac{1}{4}$	$2\frac{1}{4}$
Tea, Black or Green.....lbs.	15	5	Silk.....yds.	$2\frac{1}{4}$	$2\frac{1}{4}$
Tapioca.....lbs.	8		Pencils, Hair, assorted sizes.....no.	12	12
Ice.....lbs.			Pins.....papers.	2	2
<i>Instruments.</i>			Roller Bandages, assorted...doz	16	16
Cupping Glasses, ass'd sizes, no.	12		Silk, Green, for shades.....yds.	1	1
Tins.....no.	12	12	Saddlers, for ligatures...oz.	$\frac{1}{4}$	$\frac{1}{4}$
Dissecting Instruments.....case.	1		Splints, in one package.....set.	1	1
Field Case.....case.			Smith's anterior.....no.	3	3
Lancets, Thumb.....no.	2	1	Sponge, Fine.....oz.	8	8
Obstetrical Case.....case.			Suspensory Bandages.....no.	4	8
Pocket Case.....case.	1	1	Tape, Cotton.....pieces.	3	3
Probangs.....no.	6	6	Woolen.....pieces.	1	1
Scarificator.....no.	2	2	Thread, Linen.....oz.	2	1
Scissors, large and small.....no.	2	2	Tow.....lbs.	2	10
Speculum, for the ear.....no.	1		Towels.....doz.	5	2
for the vagina, glass no.			Roller.....doz.	2	
Sponge holder for the throat no.	1	1	Twine, one-half coarse.....oz.	16	8
Stethoscope.....no.	1		<i>Books and Stationery, &amp;c.</i>		
Stomach Pump, in case.....no.			Anatomy.....cop.	1	
Tube.....no.	1	1	Surgical, (of Arteries) cop.		1
Syringes, Rubber, self-inject-			Chemistry.....cop.	1	
ing, No. 1.....no.	2	2	Dictionary, Medical.....cop.	1	
Hard Rubber, 8 oz.no.	1		English.....cop.	1	
4 oz.no.			Dispensatory.....cop.	1	1
univers'l, no.			Hygiene.....cop.	1	1
Hypodermic 3 points, no.	1		Jurisprudence.....cop.	1	
Penis, glass, in cases, no.	6	6	Midwifery.....cop.		
Vagina, rubber, 1 } case.			Pathology.....cop.	1	
glass, 2. }			Pharmacy.....cop.	1	
Teeth Extracting Instr.....case.	1	1	Physiology.....cop.	1	
Tongue Depressor, hinged...no.	1	1	Practice of Medicine.....cop.	2	
Tourniquets, Field.....no.			Principles of Medicine.....cop.	1	
Screw, with pad, no.	1	2	Surgery, Principles of.....cop.	1	
Trusses, Inguinal, double...no.	1		McLeod's Surg. Motes, cop.	1	
single.....no.	3	4	Guthrie's Commentr's cop.	1	
Vaccinator, (Spring).....no.			Minor.....cop.	1	1
Vaccine Virus, Crusts.....no.			Therapeutics.....cop.	1	
<i>Dressings, etc.</i>			Longmore on Gun-shot		
Adhesive Plaster.....yds.	10	5	Wounds.....cop.	1	
Binders' Boards.....pcs.	12	16	Jones on Diseases of the Eye cop.	1	
Cotton, Bats.....no.	2	2	Toynbee on Diseases of the		
Wadding.....sheets	2	1	Ear.....cop.	1	
Flannel, Red.....yds.	4	4	Wilson on Diseases of the		
Gutta Percha Cloths.....yds.	4	4	Skin.....cop.	1	
Ichthyocolla Plaster.....yds.	4	5	Bumstead on Venereal Dis-		
Lint, Patent.....lbs.	4	4	eases.....cop.	1	
picked or scraped, linen, lbs.	2	2	Hospital Steward's Manual cop.	1	1
Muslin, Bleached.....yds.	20	10	Blank Books, cap, hf. bd.,		
			4 qrs.....no.	4	2



ARTICLES.	Quantities.		ARTICLES.	Quantities.	
	1.	2.		1.	2.
Case Book.....no.	1		<i>Furniture and Appliances.</i>		
Envelopes, printed, assorted no.	100	100	CLASS No. 1.		
Ink, 2 oz. bottles.....no.	3	2	Basins, Tin, small, for dress-		
Inkstands .....no.	2		ers.....no.	4	4
Travelling.....no.		1	Wash, Hand.....no.	10	4
Meteorological Register.....no.		1	Bed Pans, Delf.....no.	3	1
Morning Report Book.....no.	1	1	Screens.....no.	2	
Mucilage.....bott.	1	1	Bedsteads, Iron.....no.	100	
Order and Letter Book.....no.	1		Bed Ticket Frames.....no.	100	
Prescription Book, Ward.....no.	2	2	Brooms.....no.	4	
Register of Sick & Wounded..no.	1		Brushes, Scrubbing.....no.	4	
Surgical Operations no.	1		Buckets, Wooden.....no.	4	
Regulations, Army.....cop.	1		Leather.....no.		2
Med. Departm't, cop.	1	1	Candlesticks.....no.	8	
Paper, Filtering.....packs.	1		Caldrons, 20 gallons.....no.		
Wrapping.....qrs.	4	2	Chairs.....no.	24	
Writing, assorted...qrs.	8	4	Clocks.....no.	2	
Pens, steel.....no.	24	24	Clothes-line.....feet.	300	
Penholders.....no.	4	2	Close Stools.....no.	2	
Pencils, Lead.....no.	6	6	Corks, assorted.....doz.	12	8
Portfolio, cap size.....no.	1		Corkscrews.....no.	2	1
Sealing Wax.....sticks.	1	1	Feeding Cups.....no.	4	
Blanks.....no.			Funnels, Glass, half-pint.....no.	2	
			Tin, pint.....no.	2	1
<i>Bedding.</i>			Graters, Nutmeg and large..no.	2	1
Bed Sacks.....no.	112	15	Hatchet.....no.	1	1
Beds, Water, of India-rubber no.			Hone.....no.	1	1
Blankets.....no.	200	30	Lanterns, Glass.....no.	2	3
Blanket Cases.....no.		3	Litters, Hand.....no.	4	4
Counterpanes.....no.	112		Horse.....no.		2
Cushions, rubber, air or			Looking-Glasses.....no.	4	
water, with open centre...no.	2		Measures, graduated, glass,		
Cushions, rubber, small, air			4 oz. ....no.	2	1
or water.....no.	4		Measures, graduated, glass,		
Gutta Percha Bed Covers.....no.		8	minim.....no.	2	1
Mattresses, Hair.....no.	10		Tin, gall. to pint..no.	1	
straw, moss, or chuck no.	100		Medicine Case.....no.		2
Mosquito Bars.....no.	100		Panniers.....no.		2
Pillows, Hair.....no.	112		Measuring Glasses.no.	4	2
Pillow Cases, Cotton, Col'd no.		15	Spoons, Delf.....no.	4	
Linen.....no.	148		Mess Chest.....no.		1
Ticks.....no.		15	Mortar & Pestle, Wedgwood no.	2	1
Sheets, Linen.....no.	400		Pill Boxes, wood.....papers.	4	2
			Machine.....no.	1	
<i>Hospital Clothing.</i>			Tile.....no.	2	1
Caps, Cotton.....no.	100		Pots, Chamber, Delf.....no.	10	
Drawers.....no.	200		Inodorous, Delf.....no.	2	
Gowns, Dressing.....no.	100		Rain Guage.....no.		
Shirts, Cotton.....no.	200		Range, with fixtures, &c.....no.		
Slippers.....no.	100		Razor and Strop, in case.....no.	1	1
Socks, Woolen.....no.	200		Retort, Delf, one quart.....no.	1	
			Sad-Irons.....no.	4	
			Scales & Weights, Prescript.no.	1	1
			Shop.....no.	1	
			Sheepskins, Dressed.....no.	2	1

ARTICLES.	Quantities.		ARTICLES.	Quantities.	
	1.	2.		1.	2.
Slates.....no.	1		Pans, Frying.....no.	1	
Spatulas, 3-inch and 6-inch,no.	2	2	Sauce.....no.	2	
Spirit Lamp.....no.	1		Tin.....no.	2	
Spit Mugs, without top.....no.	6		Pitchers, Delf.....no.	6	
Spittoons.....no.	12		Plates, Delf.....no.	60	
Stoves, Cooking, with fixt'rs no.	1		Pots, Coffee, Tin.....no.	4	
Tables, Bedside.....no.	50		Mustard.....no.	2	
Test Tubes.....no.	6		Pepper.....no.	2	
Thermometer.....no.	1		Tea, Delf.....no.	4	
and Hygrometer, no.	1		Salt-Cellars.....no.	6	
Tin Warmer, for Stomach.....no.	1		Spoons, Table.....no.	60	
for Feet.....no.	1		Tea.....no.	60	
Tubs, Bath.....no.	1		Steel.....no.	1	
Urinals, Glass.....no.	2	2	Trays, Butler's.....no.	2	
Vials, assorted.....no.	8	2	Tumblers, Glass.....no.	12	
Wood-Saws.....doz.	1		"Carbolic acid, (Bower's,) sulphate of iron, nitrate of lead, chlorinated lime, permanganate of potash, or charcoal, will be furnished as antiseptics or disinfectants, when required.		
CLASS No. 2.			"Applications for microscopes by medical officers in charge of general hospitals will be favorably considered, provided the evidence be satisfactory that the officer will use the instrument for the benefit of science, and will report the results of his observations to the Surgeon General."		
Bowls, Delf.....no.	60				
Cleavers.....no.	1				
Dippers, Tin.....no.	2				
Dishes, assorted.....no.	14				
Flesh Forks.....no.	1				
Gridirons.....no.	2				
Kettles, Tea, Iron.....no.	2				
Knives & Forks, of each.....no.	60				
Carving, of each, no.	2				
Bread.....no.	1				
Butcher's.....no.	1				
Ladles.....no.	2				
Mugs, Delf.....no.	60				

In addition to the articles enumerated, Ice is fully supplied to the sick. The quantity issued at Memphis, for the year ending May 31st, 1864, being no less than 4908 tons. The manner of issuing supplies is laid down in official regulations, as follows:—

“Medical Purveyors and Medical Storekeepers at depots for issue, and at field depots, and the senior medical officers of hospitals, regiments, posts, or detached commands, will make their requisitions for medical and hospital supplies upon the Medical Director, under whom they may be serving. The Medical Director will approve or modify the requisitions at his discretion; and, in ordinary cases, will transmit them to the nearest Purveyor or Medical Storekeeper, with his order for the supplies. If, however, the amount required be large, and the situation and nature of the service permit, the Medical Director will transmit the requisitions, with his recommendations indorsed thereon, to the Surgeon General.

Requisitions for outfits of medical and hospital supplies will be made for three months, and in the form of a letter, stating the number of men

or beds to be supplied, and whether for general hospitals, permanent posts, or field service. If for permanent posts, the amount of hospital accommodations must be stated, so that if less than one hundred beds, the allowance of bedding, hospital clothing, furniture and appliances, may be correspondingly reduced.

Requisitions to replenish medical and hospital supplies will always be made in detail, according to form 8, and for those articles only that are really deficient in quantity. If the supplies are to be obtained from the principal purveying depots, these requisitions will be made quarterly; if from department or field depots, they will be made at such times and for such periods as the Medical Director may prescribe. Special requisitions are not intended to take the place of the regular quarterly requisition. They are only permissible in cases of emergency; and the face of the requisition must state the circumstances which constitute the emergency, rendering such special requisition necessary."

Department and Field depots receive their medical supplies put up in packages, thereby greatly facilitating their operations, and making it but the work of a few hours to fit out a whole division, or to start a hospital of a thousand beds. The system of accountability is rigid and thorough, the Surgeon General being daily informed of every issue of whatever kind; and all officers receiving medical supplies being required to account for each and every article received.

*Memphis, Tenn., Feb., 1865.*

#### ON PULV. JACOBI VERUS.

*Cincinnati, Ohio, Jan. 30th, 1865.*

PROF. PROCTER :

*Dear Sir,*—Inclosed I send you an ancient piece of pharmaceutical literature, to which I have added the translation. I thought from the celebrity this powder has, that the original formula might not be uninteresting to your readers. Dr. James undoubtedly intended the old formula more for fevers than a simple diaphoretic—malignant fevers at that time greatly prevailing. But I believe that he must have subsequently abandoned the latter part of the preparation. The quantities used, and the proper way to make it, James undoubtedly kept a secret in his family—the grandson being the present maker—as no preparation like it has ever been made that has shown the uniform effect it does, besides leaving no irritation on the bowels, which all other antimonial powders do, especially on patients residing in hot climates.



I have for the last ten years used the "Pulv. Jacobi Verus" in my practice with great success, especially in pneumonia of children, &c.; and many of my colleagues here, have since adopted it with great satisfaction.

Newberry & Son's preparation is next in effect to James's, and in small doses, have thought it equal to it; but when you have to give from ten to twenty grains, none can compare to James's. I have always been able to detect when a spurious article was substituted in any of my prescriptions, by finding my patient immediately nauseated, with griping of the bowels, and frequently severe purging ensued.

Very truly yours,

DR. J. S. UNZICKER.

*Pulv. Jacobi Verus—or James's Powder.*

As given by Donald Monro, in the Pharmacopœia Universalis, page 264. Extracted from the Records of Chancery, London. Signed and sworn to by Robert James. 1746.

R. Sulphureti Antimonii quantum vis. Calcino in crucibello, parvam Natri nitrici copiam, et Oli Animale Dippeli guttas aliquot addendo, donec massa alba evaserit; tum Nitri parvam copiam adde et liqua; ab igne remotum lave Aqua calida et sicca residuum.

Quo facto amalgama e Mercurii, Argenti et Reguli Antimonii martialis partibus æqualibus, addita Salis Ammoniaci quantitate sufficiente, paratum infunde supra novam Argenti, Antimonii et Salis copiam, quam operationem octis et novis repete. Tum ut solvatur, in Acidum Nitricum purum immette, decantha sedulo, et evaporato, residuum calcina usque colorem aureum obtinnerit et in Alcohole lava, quo facto hujus producti granum cum granis triginta illius e calcinatione sulphureti commisce. .

Take Sulphuret of Antimony, as much as you like, a small quantity of Nitrate of Soda, and drop in some Animal Oil of Dippel, calcine in a crucible until the mass is white; after which add a small quantity of Nitre and bring it to a flux; then remove from the fire, wash with warm water and dry the residue.

After this is done amalgamate equal parts of Quicksilver, Silver, and metallic Antimony, adding a sufficient quantity of Sal-Ammoniac. When ready, pour over a new quantity of Silver, Antimony and Salt;\* this operation repeat eight or nine times. Then dissolve in pure Nitric Acid, decant the liquid carefully from the sediment and evaporate and calcine the residue until it assumes a golden color, and wash in Alcohol; of this, in this way prepared product, mix a grain with thirty grains of the above sulphurated calcination.

\* [NOTE.—In some versions of this recipe, the amalgam is directed to be distilled, and the mercury returned and re-distilled eight or nine times.—  
ED. AM. J. PH.]



## ON THE PREPARATION OF HEAVY OIL OF WINE.

By J. M. MAISCH.

The formation of ether from sulphuric acid and alcohol has led many chemists to study the effects of this acid on a limited quantity of alcohol; and many researches are recorded, detailing the results obtained with the condensable and incondensable portion of the distillate, and with the residue left in the retort. The condensable portion of the distillate consists of alcohol, if an excess of it has been used, ether, water, heavy oil of wine, and a little acetic acid; and contains a considerable quantity of sulphurous acid in solution. It is evident that the temperature must have a great influence on the relative proportion of these products, and it is to be regretted that but few observations on this point have been made.

Kuhlmann states that equal parts of alcohol and sulphuric acid, heated to  $165^{\circ}$  C. ( $329^{\circ}$  F.) yield ether and water; above that point water, sulphurous acid, elayl, oil of wine, and a little acetic acid. (*Ann. d. Pharm.*, xxxiii. 217.)

Marchand (*Jour. f. pr. Chem.*, xv. 13,) obtains from the same mixture, between  $120$  and  $165^{\circ}$  C., ( $248$  and  $329^{\circ}$  F.) alcohol, ether, and water: between  $150$  and  $160^{\circ}$  C. ether and water only; between  $160$  and  $165^{\circ}$  C. ( $320$  and  $329^{\circ}$  F.) elayl, sulphurous and carbonic acid, and a little ether, which disappears altogether above  $175^{\circ}$  ( $347^{\circ}$  F.), leaving only the gases, water, and heavy oil of wine, as the products of distillation.

By passing the vapors of absolute alcohol through sulphuric acid, kept at  $160^{\circ}$  C. ( $220^{\circ}$  F.) Lose (*Poggend. Annalen*, xlvii. 619,) obtained elayl and sulphurous acid gas, water, and heavy oil of wine. The retort contains sulphuric, isethionic, and thiomelanic acids.

Mitscherlich (*N. Ann. d. Chem. und Phys.*, vii. 12,) passed through a mixture of 10 p. sulphuric acid and 3 p. water, which boils between  $160$  and  $165^{\circ}$  C., the vapors of 80 per ct. alcohol, whereby this latter was almost completely decomposed into water and elayl (olefiant gas), containing but little alcohol and traces of ether; the residue in the retort was colorless.

If the results of the experiments of Lose and Mitscherlich are compared, we are struck at once with the great difference produced by the presence of water in the sulphuric acid and

alcohol, whereby the formation of oil of wine is entirely prevented. The conclusion must, therefore, be arrived at, that the absence of water, the generation of sulphurous, and the formation of thiomelanic acid, are requisite to the formation of the heavy oil of wine.

On heating a mixture of sulphuric acid and alcohol, sulphovinic acid is formed. By heating sulphuric acid to  $150^{\circ}$  C. ( $302^{\circ}$  F.,) and dropping nearly concentrated sulphovinic acid upon it, a black mass, undoubtedly thiomelanic acid, and heavy oil of wine, are separated, while sulphurous acid is given off. This observation of Duflos gives the lowest temperature as yet noticed in the formation of heavy oil of wine, and it agrees pretty well with the observations of Mr. C. Lewis Diehl, Jr., made at the U. S. Army Laboratory at Philadelphia, and which are published in the Proceedings of the American Pharmaceutical Association for 1864, p. 309. [See p. 126 of this number.]

A slight error has crept into that paper, which, though it scarcely affects the results, and has no influence on his deductions, needs correction. Towards the close of his paper, Mr. Diehl states that the amount of alcohol, spec. grav.  $\cdot 809$ , consumed, was  $367\frac{3}{4}$  gallons. The alcohol used was commercial 95 per cent. alcohol, which has generally a specific gravity of  $817$ , but is occasionally as low as  $\cdot 815$ . One gallon of alcohol, spec. grav.  $\cdot 817$ , weighs  $6\cdot 808$  lbs.; the amount consumed by Mr. Diehl weighed, therefore,  $2503\cdot 64$  lbs.; the yield of oil was  $558\frac{1}{8}$  oz., or one ounce avoird. for  $71\cdot 77$  ounces avoird. of the alcohol.

Since the paper above alluded to was written, Mr. Diehl has made another series of distillations, the results of which, at my request, he has put into tabular form, which I herewith present. The great care taken in noting down his observations is very commendable, and it will be seen at a glance that, practically, these numerous figures are more valuable than pages of theoretical reasoning.

In explanation of the table, it is only necessary to state that the columns 1st, 2d, &c. heating, contain the highest temperature to which the mixture rose, and the lowest to which it fell, before it was re-heated.

## PREPARATION OF HEAVY OIL OF WINE.

Observations on *Oleum Ethereum*, at the *U. S. Army Laboratory, Philadelphia, Pa.*, 1864.

DATE.		NUMBR.	Charge.	Fires Started.	Boiling (bubbles)	Boiling (active).	Reached 300° F.	First Heat.	Second Heat.	Third Heat.	Fourth Heat.	Fifth Heat.	Sixth Heat.	Highest Point attained.	Lowest point at ter rising to 300°	Boiled over.	Heating discon- tinued & temp.	Number of hours distilled.	Yield.	Amount of SO <sub>2</sub> to 1 oz. of Oil.	Amt. of Alcohol to 1 oz. av. Oil.	Amt. of Alcohol to 1 oz. av. Oil.	Aeth. (meas.)	Amt. of Alcohol (weight).	Percentage of Oil of alcohol used.	Specific Gravity of Oil.	60° F.	REMARKS.
1864.								° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	P. M.	P. M.	oz.	oz.	oz.	hd. oz.	oz.	
October 17....	1	7½	7.30	222	235	9.15	311 314 312 312 310 310	310 310 310 310 310	310 310 310 310 310	310 310 310 310 310	310 310 310 310 310	310 310 310 310 310	310 310 310 310 310	314 300 5	6	8.45	6½	139.20	74.08	59.93	1.668	1.075	1.668	1.075	1.668	1.075	Distillation proceeded properly.	
"	"	17....	2	5½	7.30	220	242	9.45	302 307 310 315 312 310 310	307 310 315 312 310 310	302 307 310 315 312 310 310	302 307 310 315 312 310 310	302 307 310 315 312 310 310	315 298 5	6	8.15	5½	125.71	67.049	54.24	1.843	1.075	1.843	1.075	1.843	1.075	"	
"	"	19....	3	7½	7.15	212	236	8.50	306 310 312 314 314 308	306 310 312 314 314 308	306 310 312 314 314 308	306 310 312 314 314 308	314 304 5	5.15	8.25	7	128.57	68.37	55.47	1.802	1.075	1.802	1.075	1.802	1.075	"		
"	"	19....	4	5½	7.15	230	246	9.05	304 305 304 306 305	304 305 304 306 305	312 317 321 318	312 317 321 318	321 300 3	5.15	8.10	5½	114.78	61.21	49.51	2.013	1.075	2.013	1.075	2.013	1.075	Indications of frothing.		
"	"	21....	5	7	7	230	249	8.30	312 315 315 313 313	312 315 315 313 313	302 300 300	302 300 300	321 300 3	5	9	6½	129.23	68.92	55.75	1.792	1.080	1.792	1.080	1.792	1.080	Distillation proceeded properly.		
"	"	21....	6	5½	7	248	270	8.45	305 304 303 302	305 304 303 302	318 317 315 311 313	318 317 315 311 313	318 302 4	5.30	9.15	5	126.00	67.20	54.36	1.839	1.080	1.839	1.080	1.839	1.080	"		
"	"	24....	7	7½	7.30	228	246	8.55	303 302 304 307	303 302 304 307	310 314 316 312	310 314 316 312	316 304 3	5.30	8.55	6½	139.20	74.08	59.93	1.668	1.075	1.668	1.075	1.668	1.075	Indications of frothing.		
"	"	24....	8	5	7.30	230	260	9.10	305 304 304	305 304 304	325 324	325 324	316 304 3	4.20	7.10	6	100.00	56.00	45.30	2.207	1.075	2.207	1.075	2.207	1.075	{ Ran over on second raising of heat.		
"	"	26....	9	7	7	238	250	8.30	301 298	301 298	318 318 314 306	318 318 314 306	325 298 2	4.20	7.50	6½	124.44	66.37	53.69	1.862	1.080	1.862	1.080	1.862	1.080	Indications of frothing.		
"	"	26....	10	6½	7	238	258	8.25	320 320 315 310	320 320 315 310	304 304 303	304 304 303	320 303 3	4.20	7.55	5½	120.19	64.00	51.77	1.951	1.080	1.951	1.080	1.951	1.080	"		
"	"	28....	11	7	7	230	260	8.30	314 319 319 312	314 319 319 312	319 302	319 302	319 302 3	3.55	7.25	7½	115.84	61.931	50.021	1.996	1.0875	1.996	1.0875	1.996	1.0875	"		
"	"	28....	12	5½	7	238	258	8.20	319 334 314	319 334 314	303 302	303 302	334 302 2	12.30	4.10	5	126.00	67.20	54.36	1.839	1.0875	1.839	1.0875	1.839	1.0875	"		
"	"	31....	13	7	8.45	228	254	10.20	310 316 320	310 316 320	305 304	305 304	320 304 2	4.25	6.05	7	129.00	64.00	51.77	1.931	1.085	1.931	1.085	1.931	1.085	Frothed very high.		
"	"	31....	14	5½	7.15	240	258	8.45	317 319 319	317 319 319	305 306	305 306	320 304 2	12.35	3.55	4½	132.88	70.63	57.13	1.750	1.085	1.750	1.085	1.750	1.085	Ran over very early.		
November 2....	15	7	7	241	270	8.55	312 322 313 315	312 322 313 315	312 322 313 315	312 322 313 315	312 322 313 315	312 322 313 315	312 322 313 315	4	5.15	3.20	7½	112.00	59.73	48.32	2.069	1.075	2.069	1.075	2.069	1.075	Distillate very large.	
"	"	2....	16	6½	7	240	258	8.45	306 304 303 302	306 304 303 302	313 316 313 312 310 312	313 316 313 312 310 312	316 302 5	5.15	8.30	7½	107.58	57.51	46.00	2.173	1.075	2.173	1.075	2.173	1.075	"		
"	"	4....	17	7	7	236	258	8.35	306 304 306 302 304	306 304 306 302 304	318 317 315 317	318 317 315 317	318 303 3	3.30	6.55	6½	124.44	66.37	53.69	1.862	1.075	1.862	1.075	1.862	1.075	{ Distillation stopped on account of frothing.		
"	"	4....	18	6½	7	244	256	8.40	313 313 313 314 316	313 313 313 314 316	305 306 303	305 306 303	318 303 3	6	9.20	8½	94.55	50.42	40.79	2.451	1.075	2.451	1.075	2.451	1.075	Distillation proceeded properly.		
"	"	7....	19	7	7.10	250	270	8.35	304 303 303 304	304 303 303 304	318 311 311 310 314	318 311 311 310 314	316 303 4	1.30	5.55	7½	115.68	61.798	49.99	2.000	1.075	2.000	1.075	2.000	1.075	{ Distillation stopped on account of frothing.		
"	"	7....	20	6½	7.10	240	252	8.35	325 316	325 316	315 315 310 316 314 310	315 315 310 316 314 310	318 305 4	5.45	9.10	6½	115.55	61.629	49.85	2.005	1.075	2.005	1.075	2.005	1.075	Distillation proceeded properly.		
"	"	9....	21	7	7	240	268	8.35	303 303 305 306 304	303 303 305 306 304	318 311 311 310 314	318 311 311 310 314	316 303 5	6	9.25	7½	115.68	61.793	49.99	2.000	1.075	2.000	1.075	2.000	1.075	"		



## REMARKS.

Observations on Oleum Ethereum—(Continued.)

DATE.		CHARGE.		FIRE STARTED.		BOILING (BUBBLES).		BOILING (ACTIVE).		REACHED 300° F.		FIRST HEAT.		SECOND HEAT.		THIRD HEAT.		FOURTH HEAT.		FIFTH HEAT.		SIXTH HEAT.		HIGHEST POINT ATTAINED.		LOWEST POINT REACHING TO 300°		BOILED OVER.		HEATING DISCONTINUED & TEMP. AT 300°.		NUMBER OF HOURS AT 300°.		YIELD.		AMOUNT OF SO <sub>2</sub> TO 1 OZ. OF OIL.		AMT. OF ALCOHOL (MEAS.)		AMT. OF ALCOHOL (WEIGHT).		PERCENT. OF OIL OF ALCOHOL USED.		SPECIFIC GRAVITY OF OIL.		TEMP.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
1864.		C.G.		A.M.		O.F.		O.F.		A.M.		O.F.		O.F.		O.F.		O.F.		O.F.		O.F.		O.F.		O.F.		P.M.		P.M.		P.M.		OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL. OZ.		FL.	



In 25 days, forty-two distillations were made, and 2055 lbs. sulphuric acid and 137 gallons of strong alcohol used. The yield was 288 oz. of heavy oil of wine; the specific gravity was taken with a hydrometer, but no correction was made for the difference in temperature, of which no record was kept. The above quantity of alcohol weighs 932.7 lbs., and one ounce of heavy oil of wine was therefore produced from 114.16 oz. sulphuric acid and 51.82 oz. avoirdupois of alcohol, which makes very nearly 2 per cent. of the latter.

The table appended to Mr. Diehl's paper may now be extended as follows:

	Dr. E. R. Squibb.		C. Lewis Diehl, Jr., at U. S. A. Laboratory.	
			1st series.	2d series.
Sulphuric acid required to make				
one avoird. oz of oil of wine,	173	av. oz.	157	av. oz.
Alcohol required for the same,	111	"	71.77	"
Average yield from each distillation,	4.54	"	5.52	"
			6.86	"

If we examine the temperatures in Mr. Diehl's table, it will be observed that large yields were always obtained where the temperature was steadily kept between about 302 and 315° F. His largest yields were Nos. 18, 28, and 37, furnishing one oz. of oil of wine for 49 to 50½ fluidounces of alcohol. With five re-heatings, the temperature was steadily between 302 and 315, rising in the first instance, towards the close, to 316, and in both the other cases attaining the temperature of 317 at the beginning of the process.

The second best yields, requiring 52 to 53 fluidounces of alcohol for one ounce of oil, were Nos. 24 and 27. In the former the temperature rose at first to 319, but was subsequently kept between 301 and 312; No. 27 was kept between 302 and 314, rising only towards the close to 318°.

On the other hand, it will be observed, that where he obtained small yields, the temperature either rose considerably and frequently above 315, or fell below 302. Thus, of the distillations yielding one ounce of oil of wine for 75 and 78 fluidounces of alcohol, the temperature rose in No. 42 to 324, and in No. 33 to 321°. In No. 22, yielding one ounce of oil from 64 fluidounces of alcohol, the temperature fell to 282°; in Nos. 2 and 9, it fell to 298°, and the yield was one ounce from 66 to 67 fluidounces of alcohol. The only case in which

a large yield was obtained at a high temperature is No. 8, which reached 324 and 325°, and subsequently ran over; from 56 fluidounces of alcohol one ounce was obtained.

Heavy oil of wine is decomposed into the so-called light oil of wine and sulphovinic acid, if it is left in contact with cold water for some time; the decomposition is rapid and complete if warm water, or a solution of an alkali, or the carbonate of an alkali, is used. It is evident, therefore, that in order to insure the least possible loss, the washing of the crude oil with cold water must be effected in as short a time as possible.

It has been stated by Dr. Squibb and by Mr. Diehl that the formation of a crust of thiomelanic acid on the surface of the liquid in the retort, is favorable for the production of oil of wine. This may, perhaps, be accounted for by an increase of the pressure within the liquid, whereby the oil is more easily carried over with the gaseous sulphurous acid. If this crust is broken and the liquid stirred, the extrication of gases occurs so rapidly that foaming almost always takes place. Still it may be possible that the yield of oil might be increased by preventing the formation of the crust alluded to altogether, because the vapors of the oil might thereby be more readily diffused through the gases and vapors with which it distils over. Necessarily the charge for the same retorts would then have to be lessened to give room for the frothing which inevitably takes place. Another question is, whether, even if the yield was thereby increased to a certain extent, it would pay so well as with a comparatively smaller yield from a heavier charge in the same time.

Mr. Diehl is entitled to great credit for his careful observations, for his suggestions of the mode of re-heating to keep the temperature in this troublesome process within certain limits, and for by far the best results as yet obtained.

*Philadelphia, February, 1865.*

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#### NOTE ON CARAMANIA GUM.

BY WILLIAM PROCTER, JR.

Whilst engaged in the revision of the U. S. Dispensatory, Dr. Wood was presented by Mr. Benjamin R. Smith, of Philadel-

phia, with a sample of gum from a large invoice under the name of "Caramania Gum." No account of its origin could be given by Mr. Smith; but there can be little doubt that it is the same gum described by Mr. S. H. Maltass (Pharm. Journ., vol. xv. p. 20), as one of the gums used habitually to adulterate tragacanth. Mr. Maltass states that this gum is employed, to the extent of 50 per cent., to adulterate the commoner varieties of tragacanth; and to render the cheat less perceptible, is sometimes whitened by the addition of white lead. Mr. Hanbury (ibid. p. 21), in a note, states that the Caramania gum appears identical with the "*Gomme pseudo-adragante*" of M. Guibourt, regarded by that author as the product of *Astragalus gumifer*, Labill; but it is referred by report, says M. Maltass, to the wild almond, a plum of Caramania.

The "Caramania gum" occurs in pieces, varying in size from a pea to a large chestnut, with a greater tendency to the spherical than tragacanth, though sometimes with a tendency to the contorted vermicular form, so common in tragacanth. Its color varies from light to reddish-brown, more or less translucent, nearly tasteless, and slowly absorbing moisture when placed in water, swelling up to bulky hydrated, jelly-like masses; whilst the intermediate spaces are filled with a mucilaginous solution of the more soluble part of the gum, but the soluble portion is evidently less abundant than in tragacanth. The mucilage is precipitated by subacetate of lead, but less decidedly than is arabin; oxalate of ammonia causes a white precipitate, not very abundant; alcohol does not instantaneously precipitate it in flakes like arabin, apparently because of a greater resistance of the mucilage to be penetrated by that liquid. It is not coagulated by borax, or sesqui-chloride of iron. The gelatinous insoluble part has but little cohesive power at first, but by standing, it softens and becomes more paste-like. When boiled with dilute sulphuric acid, it loses its jelly form and assumes a syrupy condition, being converted partially into soluble gum and partially into glucose, as indicated by Trommer's test. A solution of oxide of copper in potassa instantly precipitates both this and the soluble gum as a bulky bluish hydrate. Dr. Wood considers Caramania gum to have the same origin as the gum of Bassora, and that probably both are produced in the Province of Caramania, in Asia Minor—the

latter entering commerce by the Persian Gulf, whilst the former comes to Smyrna, to be used as an adulterating agent.

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## THE PHARMACEUTICAL DEPARTMENT OF A U. S. A. HOSPITAL.

BY EDWARD R. FELL, M. D.

The Pharmaceutical Department of "Mower" U. S. Army General Hospital, Chestnut Hill, within the City limits of Philadelphia, is situated on a corridor which bisects the ground enclosed by the wards of the hospital, which are arranged in the form of a quadrilateral with rounded corners.

This provides ready access to different portions of the building. It consists of three apartments; one of which is styled the "Dispensing" room, another the "Store" room, and a third a small out-house, in which are manufactured those preparations requiring heat, and those that would otherwise, by vapors, dust, etc., incommode the occupants of the store room.

The first of these is  $68 \times 14$  feet, of which a small portion is partitioned off as an office and sleeping apartment for the hospital Steward in charge. The counter is 60 feet long by 3 feet wide, and is placed opposite three good sized windows; one half of its width is devoted to its legitimate use, and the other to a series of wooden compartments, which are adapted to contain forty-seven tin trays, one for each ward. Into these trays the prescriptions, dressings, etc., ordered by the Surgeons are placed: they are then carried to their respective wards by the "Ward Masters," and replaced, after the articles are distributed.

Four pairs of scales are kept on the counter; two for prescriptions, and two for weighing amounts of the gravity of four or five pounds.

The shelves, back of the counter, are divisioned off into twelve equal portions, in which the medicines are, to a great extent, similar. Thus each prescriptionist may fill his prescriptions without moving from his place. By this provision, all confusion is avoided, and time saved.

Each division contains eight quart salt-mouth bottles, containing substances usually prescribed in considerable amount; twenty-



four quart "tinctures," for the various Ethers, Syrups, Fluid Extracts, Tinctures, and Waters, in most common use; twelve six-ounce covered jars, for Pills, Ointments, and Solid Extracts; thirty-four ounce salt-mouth bottles, for Quinine, Morphia, Salts of Mercury, Powdered Rhubarb, etc. The lower shelf, wider than those above, surmounts three rows of drawers, which, however, have proved of but little use, all the drugs being kept in glass-stoppered bottles. On this shelf is kept a pair of small scales and weights, and sufficient room is afforded for the use of the utensils required in compounding prescriptions.

In one end of this apartment is a capacious sink, furnished with hot and cold water, over which are to be found Glass Funnel, Mortars, Graduates, and a large number of empty vials, from half to eight ounce, cleaned and ready for use. In another end of the room is a small closet in which are kept the mineral acids, Atropia, Strychnia, Bromine, etc.

When the hospital is full, its capacity is 3600; the force employed in the "Dispensary" is twelve. They are intelligent pharmacutists, and are employed by contract. To each one is apportioned four wards. He fills the orders from these wards, and is required to have his division cleaned and put in working order twice daily. He keeps a note of the bottles that need replenishing, and at an appointed time fills them from the supplies on hand in the "Store-room." An accurate account of articles thus furnished is kept, so as to make the amounts on hand tally with those furnished. Night calls are answered by the Steward.

From 500 to 800 new prescriptions are put up here monthly, and during the year that I have been on duty here, no serious mistake has occurred; on the contrary, not a few errors in prescriptions are detected and returned for correction. The compounding is accurate and neat, and reflects considerable credit on those engaged in this responsible business.

Prescriptions are written by the Physicians on printed blanks, on which, in four places, around the margin, in large type, is printed the number of the ward; this, together with the fact that the name, and bed-number of the patient prescribed for, is written in an apportioned place, renders it scarcely possible for a prescription to get to any but the proper person. Empty bottles,

pill boxes, etc. being placed outside of the door of each ward, are returned to the dispensary by means of a small car, which, running on a track around the hospital, at the same time, supplies the various stimulants to the wards. Every article, whether medicine or dressing, furnished to the wards from this department, requires an order written on a prescription blank, as an accurate account of such articles as Syringes, Air Cushions, Medicine Glasses, etc., is kept with each ward. An inventory of what is kept in the ward, is furnished weekly to the dispensary by the Surgeon in charge of the ward. Articles returned are accompanied by a receipt which secures the proper credit.

Books for reference are kept in the Steward's office, and consist of the "U. S. Dispensary," "Fowne's Chemistry," "Parrish's Pharmacy," and the "Pharmacopœia," which latter, however, is not on the Supply Table.

Communicating with the Dispensary is the "Store-room." This is 30 by 29 feet. About one-fourth of it is boarded up and kept under lock and key. Here is stored Wine, Brandy, Whisky, Porter, etc., and some of the more valuable Drugs; among the latter, I noticed, 200 oz. of Sulph. Quinine, 200 pounds Patent Lint, Sulph. Morphia, Ether, Chloroform, fine Sponge, Iodide of Potassium, Citric Acid, etc., in large amount.

Two sides of the "Store-room" are devoted to stout shelves, on which large quantities of Tinctures, Fluid Extracts, Syrups, Waters, various Salts, "made up" Pills, Powders, etc., are kept. Liquid preparations are contained, for the most part, in tin cans and bottles. Ointments, and Cerates, those used largely, are kept in large stone jars.

Another wall of this room is provided with large "pigeon holes," which contain Bandages, Trusses, Castile Soap, Isinglass, and Adhesive Plaster; under these, shallow drawers contain various spread Plasters; for most of the latter, paper is used, sheepskin being too expensive. Usually four persons are employed in this room. Each has his prescribed duty to perform; one attending to the liquor orders, another to the manufacture of the preparations, and so on.

All sorts of medical appliances may be found here, and in fact

most of the articles obtained by requisition for a three months supply for 3600 beds.

There is a display of neatness and order in this department, which commends itself to the most particular.

Opening a back door, you are under a shed which affords protection for the railroad cars, of which I have spoken. A few yards further and you come to the "Laboratory," 14 by 16 feet, built of stone. The apex of the roof is closed by a sky-light, which provides for the exit of troublesome smoke and fumes. Here may be found a large-sized cooking stove, and some of the more ordinary apparatus used in the manufacture of pharmaceutical preparations.

Almost all of the officinal Tinctures are prepared here, in quantities ranging from 10 gallons, to  $\frac{1}{2}$ -gallon. Most of these are made by maceration, as percolators, except Glass Funnels, are not furnished.

Many of the Fluid Extracts, and a few Solid Extracts, are made here, but the proper means for the nice regulation of the heat used in evaporating is not available; those that I have had occasion to use, however, have proved efficient in the ordinary doses. Among the preparations made here may be mentioned: the principal Emplastra, Pill Ferri. Carb., Hydrarg. Biniodid., and Protiodid. Hydrarg. c. Cretæ, Potassii Sulphuret., and most of the Syrups, Cerates, Ointments, Wines, and Waters of the Pharmacopœia.

Medical supplies are obtained on requisitions, signed by the Surgeon in charge of the hospital, and "approved" by the "Medical Director," from the "Medical Purveyor." Most of them come from the U. S. A. Laboratory located in this city; others bear the labels of our widely-known manufacturers. Printed "Supply Tables" enumerating all the articles furnished by the Government, are provided, together with the "allowance" for a certain number of beds, for a certain time. The amount on hand must be stated, as well as the amount required. In connection with this, the following Table may prove interesting:



PHARMACEUTICAL DEPARTMENT OF A U. S. A. HOSPITAL. 111

	Quantity allowed by supply table for 9 months.	Am't used over allowance in 9 months.	Excess of allow- ance for nine months.	Amount expend- ed in nine months.
Acaciæ Pulv.,	130½ lbs.		36½ lbs.	94 lbs.
Acid Acetic,	40½ "		13½ "	27 "
" Citric,	67½ "		29½ "	38 "
" Muriatic,	22½ "		8½ "	14 "
" Nitric,	31½ "		14½ "	17 "
" Sulphuric,	22½ "	8½ lbs.		31 "
" Phosphoric,	4 "		29-16ths lb	17-16ths lb
" Tannic,	12 3-8ths lb		6¼ lbs.	6 1-8th lb
" Tartaric,	130½ lbs.		93½ "	37 lbs.
Aloes Pulv.,	7 7-8ths lb		5¼ "	1½ "
Ammon. Spts. Arom.,	20¼ lbs.		6¼ "	13¼ "
Ant. et Pot. Tart.,	3 3-8ths lb		7-8ths lb	2½ "
Argent. Nit. Fus.&Cr.,	12 3-8ths lb		3¼ lbs.	8½ "
Cerat. Adipis,	648 lbs.		268 "	380 "
" Canth.,	90 "		60 "	30 "
Cinchonæ Sulph.,	84 3-8ths lb		76⅜ "	8 "
Chloroformum,	117 lbs.	106 "		223 "
Creta Prep.,	40½ "	29¼ "		70¼ "
Ether Sulphuric,	261 "		191 "	70 "
" Nitrosi, Spts.,	216 "		64 "	152 "
Ext. Fld. Aconit. Rad.,	40½ "		18½ "	22 "
" " Cinchonæ,	67½ "	12½ "		80 "
" " Colch. Sem.,	24 11-16ths.		13⅜ "	11 5-16ths lb
" " Valerianæ,	40½ lbs.		13½ "	27 lbs.
" Solid, Conil,	5 "		2⅝ "	2⅝ "
" " Belladon.,	5 "		29-16ths lb	27-16ths lb
Hydrarg. C. Mit.,	27 "		15¾ lbs.	11¼ lbs.
" Pilulæ,	13½ "		10½ "	3 "
" Unguent.,	72 "		48 "	24 "
Bals. Copaib.,	153 "		64 "	89 "
Tinct. Ferri Chlor.,	67½ "	37¼ "		104¾ "
Syr. Ferri Iodid.,	36 "	2 3-8ths lb		38⅝ "
Liq. Ferri Persul.,	20¼ "	3 3-16ths lb		237-16ths lb
Pulv. Ipecac. et Opii,	40½ "		27 "	13½ lbs.
Farina Lini.,	58½ "	115⅝ lbs.		174⅝ "
Morphiæ Sulph.,	20½ oz.	6¾ oz.		27 oz.
Ol. Morrhuæ,	124 galls.		71 galls.	53 galls.
" Ricini,	99 "		66 "	33 "
Tinct. Opii,	8½ "	24½ galls.		33 "
" " Cam.,	8½ "	17 "		25½ "
Pil. Cath. Comp.,	700 pills.	12888 pills.		20588 pills.
Potassii Iodid.,	99 lbs.		19 lbs.	80 lbs.
Quiniæ Sulph.,	62 "		33 "	29 "
Strychnia,	4½ oz.		3 oz.	1½ oz.
Liq. Sodæ Chlorin.,	270 lbs.	640 lbs.		910 lbs.
Emp. Adhesiv. spread,	495 yards.	2665 yds.		3160 yds.
Lint. Patent sheet,	216 lbs.	832 lbs.		1048 lbs.
" Picked,	162 "	572 "		734 "
Oiled Silk,	162 yards.	108 yds.		270 yds.
Oiled Muslin,	162 "	405 "		567 "
Fine Sponge,	20 lbs.	12 lbs.		32 lbs.



*Not on Supply Table, and furnished by special requisition.*

Bromine .....	13 lbs.
Lupuline.....	$\frac{1}{2}$ "
Powd. Rad. Jalap.....	$1\frac{1}{8}$ "
Ext. Fld. Sarsap.....	33 "
Potass. Permang.....	$12\frac{3}{4}$ "
Potassii Bromid.....	2 oz.
Gum Ammoniac.....	$1\frac{1}{4}$ lbs.
Pix Abietis.....	10 "
and many others.	

From this it will be perceived that, in most instances, the allowance is in great excess, falling short mostly in the way of "Dressings," Chloroform, the simple and camphorated Tincture of Opium, and Sulphate of Morphia. Chloroform is used here, almost entirely, in preference to Ether.

Where the allowance falls short, special requisitions are made on the Purveyor. Almost any additional medicines may be obtained in this way. Some of those obtained are mentioned in the table I have furnished.

It will be seen that the reputation of our Government, for the care of its soldiers, is well sustained in the matter of medical supplies.

A yearly report of all medical and hospital property received, expended, issued, and remaining, must be furnished to the Medical Department at Washington, and every article that has been supplied must be satisfactorily accounted for. Broken articles are "condemned" at the time of the visit of the "Inspector," and those destroyed require a voucher, properly signed.

As regards the Pharmaceutical, as well as in the other departments of this Hospital, the greatest economy, consistent with the comfort of the patients, is practiced; and few "leaks" escape the vigilance of the Surgeon in charge and his executive officer.

I cannot close this article without acknowledging the courtesy, in regard to these details, of Steward Pierson and his assistants.

*Philadelphia, Feb. 8, 1865.*

## ON PURE CARBONIC ACID, MINERAL AND LITHIA WATER.

BY PROF. HENRY WURTZ.

I am desirous of directing the attention of pharmacutists, through the pages of the American Journal of Pharmacy, to a subject whose more careful consideration would, I believe, result in great advantages to the public as well as themselves. I allude to the provision and production by them, of purer, more wholesome, more palatable and more reliable forms of carbonic acid water and artificial mineral waters. It has now become so universal a practice on the part of the public to resort for such preparations to the counter of the pharmacist, that it behooves every earnest man of this class to follow up closely the march of discovery and improvement in this important branch of his art, and to place himself, in this respect, on a level above that of the mere bar-keeper or the vender of ginger pop.

Notwithstanding the great attention given by eminent transatlantic chemists and medical men, to the artificial fabrication of the waters of natural healing springs, it is not to be denied that few of our American chemists have accomplished much in this field; and as to our physicians, it may be asserted that they also have generally treated it with neglect. This undervaluation of the matter may be clearly shown to be, to use mild terms, improper and inconsiderate. Without, however, entering upon the discussion of this extensive topic at length, we may give here a paragraph relating to "Seltzer water," from a little work recently published by Carl Schultz, a young chemist of New York, who has devoted himself for a number of years to the study of the practical manufacture, on a large scale, of pure mineral waters, a paragraph which will be eminently suggestive, to every intelligent man, of the truly *vital* importance of the subject.

"The great effectiveness of certain Spas should not, therefore, be ascribed to one or two of their prominent constituents, but to the very harmony which their composition presents with the mineral ingredients of the human blood. Let us take *Sellers*, for example, and compare its composition with that of the ashes of blood serum, according to an analysis which is considered as the most reliable one (by Lehmann:)

	Blood serum.	Selters.
Chloride of Sodium . . .	17.292 grains.	17.2920
Chloride of Potassium . . .	1.150	0.3580
Carbonate of Soda . . .	8.180	6.1533
Phosphate of Soda . . .	0.900	0.0042
Sulphate of Potash . . .	0.780	0.3970

The resemblance would be still more striking, should we compare all mineral ingredients of the *blood* with those of Selters; and that Spa has, on that account, always seemed to us, of all natural mineral water, the most philosophically compounded. It is not a whim that has made of Selters a luxury; it is not an accident that it agrees with people, that it is always liked, and that they never get tired of its use. We explain it by the composition of the Spa; it furnishes the normal mineral ingredients of the blood in a condition in which they are easily absorbed, independently of the state of digestion; it must have a tendency to establish them in their normal fixed proportion, and to induce a healthy metamorphosis of matter by reflex action. It is also apparent why other Spas of more marked variations can be advantageously used for the restoration of a normal condition of the blood, in cases where its composition has undergone more serious changes; and why carbonic acid water, by dissolving the mineral ingredients of food, will gradually produce the same result. The single consideration that blood contains its own volume of carbonic acid gas in solution, shows the importance of using water of the same condition. The production of carbonic acid is largest in a healthy state of the system, and is always diminished in chronic diseases, and in most conditions which interfere with perfect health; and as that gas must form an important constituent of the gastric juice and intestinal liquids, we find such disorders usually accompanied by impaired digestion, and the use of carbonated waters signalized by improved nutrition."

For much further matter of moment I must refer to the original\*, which is in fact a compendium that should be read by every medical man and pharmacist.

The practical artificial reproduction of such a mineral water, (which, in view of the analogy pointed out by Mr. Schultz, we may call, almost without hyperbole, the natural milk of our mother earth presented to us fresh from her bosom,) all chemists know to be a matter of far less simplicity than is usually imagined. The preparation, on a large scale, in a reliable state of purity, and homogeneous combination of the ingredients, belong to the most difficult

\* Schultz & Warkers' Mineral Spring Waters, etc., by Carl Schultz. Published by Westermann & Co., New York, 1865.

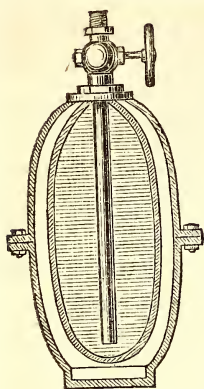
and delicate class of manipulations. Space will here allow only more particular allusion to the difficulties encountered in the preparation and purification of one of the most essential ingredients, the *carbonic acid*. The materials generally used are *oil of vitriol* and *ground limestone*. Contaminations, derived both mechanically and chemically from both of these, are almost invariably imparted to the gas.

Mechanically (in the form of infinitesimal spray) may be carried over sulphates of lime, magnesia and iron, with the sulphuric acid itself, and *lead* and sometimes *arsenic* contained therein; while chemically there may pass over sulphurous acid (from the oil of vitriol,) sulphuretted hydrogen (from pyrites and other metallic sulphurets in the limestone,) and frequently, also, the limestone evolves, under the action of the acid, bituminous and nitrogenous organic vapors of nauseous odors and savors. What wonder that the opinion should be prevalent, even among those accustomed to natural carbonic acid waters, that plain "Soda Water," as found in the shops, must necessarily be a nauseous dose, only made palatable by disguising it with syrups, essences, etc.

Let no captious Rip van Winkle, adherent to the hermetical lore of our grandsires, aver that these minute impurities are therapeutically nugatory. Such a one, to be consistent, must repudiate such waters altogether, both natural and artificial, for—without going to the same absurd extreme as Hahnemann's disciples—we cannot, at the present day, deny that the frequent repetition of minute, though still chemically appreciable, doses of powerful medicaments, will usually produce in time a greater or less cumulative effect.

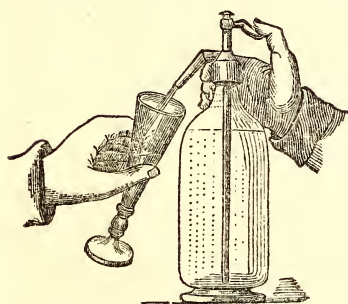
Even if these initial difficulties have been conquered, as they usually *are not*, the storage and preservation in quantity of carbonic acid water presents a new class of obstacles. Reservoirs for the purpose must have the difficultly compatible qualifications of infrangibility, both by pressure and percussion, cheapness and total resistance to the solvent power of the acid liquid. No *metal* combines these, except possibly tin of *chemical purity* (an article not of commercial attainment at present, as the best Banca tin is contaminated with copper, zinc, lead and arsenic.) Common





glass is too frangible, and has not sufficient resisting power if vessels of large capacity are required, and malleable glass is still among the "lost (?) arts." Still, it would appear that this universal material has been made available for the purpose, as the glass reservoir or soda water fountain here figured (patented by Schultz & Warker) is an apparatus already in use.\* The

outer cylinder is of metal, the inner only, which contains the liquid, of glass. There is a gas communication and consequently equality of pressure between the interior and exterior of the glass vessel, so that the latter has nothing to sustain, but the weight of itself and contents. The fitness of the arrangement is at once apparent. The small portable glass fountains, which are operated by a thumb press, are becoming well known.



The most interesting chapter in Mr. Schultz's treatise is that upon artificial *lithia waters*, which he has been the first to introduce into our American Materia Medica. This chapter, after discussion of

the successive discoveries of Arfvedson, Bunsen, Lixowitz, A. Ure, Garrod, Ruef and others, gives the results of some original researches by Mr. S. himself; the whole forming an array of facts relating to the power of lithia waters, to remove morbid secretions of uric acid and urates, which must convince any candid mind that we now possess a powerful specific antagonist to one of the most cruel enemies ever loosed from Pandora's box to scourge our race for its "pleasant vices."

I shall close with a condensed review of some of the more important facts presented by Mr. S., most of which will be new to a large class of readers. The name *lithia*, given by its discoverer, Arfvedson, in 1818, because supposed then to be exclu-

\* These fountains, I am told, are now being manufactured in New York.

sively a mineral alkali, and found only in *stones*, was found by Bunsen, a few years since, by spectrum analysis, to be a misnomer, lithia existing also in grain, grapes, milk, blood, etc. Lixowitz first discovered the great affinity of lithia for uric acid, and that the urates of lithia were by far the most soluble of all urates. Alex. Ure experimented on a human calculus containing uric acid with carbonate of lithia at  $98^{\circ}$ , and finding it actively dissolved, proposed injections of lithia solutions into the bladder in cases of calculus. Garrod, in 1857, found that when water was boiled with an excess of carbonate of lithia, addition of uric acid dissolved the whole with formation of soluble biurate. He also acted upon a metacarpal bone, the phalangeal extremity of which was completely infiltrated with a gouty deposit of urate of soda, with a few grains of carbonate of lithia, which dissolved the whole deposit in three days. In 48 hours a cartilage, infiltrated with urate deposit, was similarly restored to its normal condition. G., therefore, recommended carbonate of lithia in *uric acid diathesis with gravel and in chronic gout*. He found that one to four grains, two or three times a day, caused gravel to diminish, and even to cease. At that early day enough lithia was not attainable, even for experimental purposes, so that additional conclusions had to be deduced from observations on natural lithia waters. Ruef reports that the *murquelle* of *Baden-Baden*, containing 2.37 grains of chloride of lithium in 16 ounces, which has recently been found suitable for patients suffering from gout and lithiasis, in almost all cases causes *an increased pain in the joints at first*, in bad cases amounting to torture, but that a rapid cure follows, cases of not too long standing yielding in three or four weeks. The practice was in some cases to put in additional quantities of carbonate of lithia, and *then to impregnate the water with carbonic acid*.

Mr. S. remarks that our knowledge of the reactions and even of the solubilities of uric acid and the urates are very incomplete, these solubilities, as given in the text books, "having been mostly determined for hot and cold solutions, while physiologically it is of the highest importance to have them made at the temperature of the blood." One part of carbonate of lithia and one part of uric acid dissolves in 90 parts of water at the ordinary tempera-

ture, but at boiling heat one part of carbonate of lithia dissolves almost four of uric acid. In following up the above experiment of Garrod, Mr. S. found that the simultaneous solution of carbonate of lithia and uric acid was accompanied by *no effervescence*, bicarbonate of lithia being formed. On adding more uric acid gradually, at the point when the whole of the lithia becomes either urate or bicarbonate, effervescence commences, and until this effervescence ceases the uric acid continues to dissolve. Mr. S. concludes that "the urate of lithia is more soluble than the carbonate, and less soluble than the bicarbonate." After the effervescence and taking up of the uric acid ceases, a little water added will clear up the solution, and enable it to take up still more uric acid. He finds that a mixture of chloride of lithium and carbonate of soda has the same solvent power as the carbonate of lithia, accounting for the medicinal action of natural waters containing the lithium as chloride, this being necessarily decomposed in the blood by the alkalies thereof. He gives the formulæ of his "Lithia Water" and "Vichy with Lithia," which are prepared with great care, and have proved highly successful in a number of cases.

Schultz points out that while it cannot be expected that lithia water can remove calculi which consists of phosphates and oxalates instead of urates, yet that Wöhler and Frerichs have shown\*, by experiments on man and dog, that the administration of urates causes the excretion of *large quantities of oxalate of lime in the urine*. Referring to the discoveries of Wiederhold, that uric acid is excreted by the lungs and *skin*, as well as the kidneys, he asks whether the absence of diaphoresis, often observed in gouty persons, may not be connected with an accumulation of uric acid. Also, that the fact stated by Lehmann, that in all *fevers* the proportion of uric acid in the urine always increases, suggests an important extension of the usefulness of lithia waters. The symptoms observed as following the use of Schultz & Warker's lithia waters agree closely with those described by Ruef above, namely, an increased pain in the affected parts at first, and a subsequent amelioration of the disease. This pain furnishes a valuable index of the progress of the cure.

\* Ann. der Chem. und Pharm., 65, p. 385.

The production of lithia, Mr. S. believes, will soon become equal to the demand. Among the recently discovered sources, he cites the hot springs of Wheal Clifford, whose waters contain enough lithium (2·85 grains of chloride in 16 ounces) to amount in 24 hours to over 700 pounds of chloride of lithium discharged therewith. The present price of pure carbonate of lithia in this country, we are told, is not less than *eight dollars per ounce*.

*New York, February 10, 1865.*

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#### BERNARD S. PROCTOR'S REPORT ON WEIGHTS AND MEASURES.

In the November number of this Journal, (vol. xii. p. 495) a very brief and imperfect abstract was given of a "Report on weights and measures used in Pharmacy," read by Mr. Bernard S. Proctor, at the Bath meeting of the British Pharmaceutical conference, September, 1864. It was again referred to in the January number, (vol. xiii. p. 74.) The importance of the subject, and the ability of the writer shown in its discussion, appear to justify a more deliberate notice of this interesting paper. Mr. Proctor, after remarking that "about forty different pounds, and almost as many different ounces" are found in use through Europe,—comments on the circumstance that "*Pharmaceutical* weights do not take such multiple proportions; some two or three systems being pretty widely used, and, on the other hand, the discrepancies between the different systems are often not so great," and that even where the decimal metrology has been established by law, or adopted by general consent for scientific and commercial purposes, "the long-used systems have retained their hold upon the medical profession;" indicating the strong feeling in favor of uniformity in *medical* weights, and against changes, liable to doubt, difficulty and danger. The writer then asks the vital question: "What objections are there to the use of the English apothecaries' weights for pharmaceutical purposes?"

He replies to this question, that "in the abstract there is little to be said against it;" and that though the relation which its divisions bear to one another is "a sort of hap-hazard affair," these are yet found to be "all convenient units for practical use."



The pound, the ounce, and the drachm, are each divisible into halves and quarters, and the pound and drachm, into thirds and sixths.

“The objections are almost all external to the system itself; they arise out of its relation to other systems, from which in practice, it cannot be abstracted; and this fact let us keep in view as a caution against systems which appear promising when seen only upon paper. However good they may be in the abstract, availeth not, for they must be judged by their readiness to fit into other systems, to fill their own place well, and work harmoniously with all collateral institutions. It is in these points that the shortcomings of our present system are found. While we buy and sell by one weight, and dispense by another, both of which have units bearing the same names, but of different values; while we have ounces of water, which, though used for dispensing purposes, correspond to the commercial weights, and drachms of water which do not agree with either the apothecaries’ or avoirdupois drachm; while a pound of water may be prescribed, but who can tell what it means; for it is frequently dispensed as  $\text{f}\overline{3}$  xvi., sometimes as  $\text{f}\overline{3}$  xii., and neither of these is an apothecaries’ pound; while we have grains in England which are heavier than grains in Ireland or Germany, and lighter than grains in Austria, and while we require to make a separate calculation for every quantity mentioned in a French formula, before we can prepare it, or even compare it with a formula expressed in English weights,—there certainly are inconveniences in the present arrangement which it is desirable to remove. But even the very statement of these inconveniences shows that no change in our system can remove them. If we move toward the Irish, we will be further from the Austrian and no nearer the French. If we adopt the metrical weights, unless they be used for all purposes, we will find a greater disparity between our dispensing and our dealing than exists at present. No wonder that all the changes which have been proposed have been rejected; they were all partial evils, not universal good.”

Various projects of reform are then referred to—As that of Mr. Jacob Bell, to engraft the troy divisions on the avoirdupois pound of 16 ounces, either employing the present grain as the standard, (increasing thereby the larger weights,) or taking the present avoirdupois ounce as the standard; (reducing the weight of the grain:—that of Mr. Griffin, who proposed to employ a unit of 7 grains, multiplying it in a decimal scale, (thereby preserving the avoirdupois pound:—that of Dr. C. Wilson, taking the avoirdupois ounce as the standard, and giving it the divisions of the present troy ounce, (thus reducing the drachms, scruples

and grains about one eleventh.) This is the system which was *provisionally* adopted by the British colleges in their recent revision of the Pharmacopœia, but which was finally abandoned.

In regard to this disturbance of the value of the grain, Mr. Proctor well remarks :

“At present we have in Britian, one grain, about which there is no mistake ; while all other weights are subject to equivocal interpretation. The scruple is 20 grains in England and 18 in Ireland ; the drachm [troy or avoirdupois,] is 60 grains, or 27 grains in England, or 54 in Ireland ; so the ounce is 480 or 437 grains ; the pound 7000 or 5760 grains. We cling to the grain, reluctant to lose our last unequivocal weight.”

These attempts at amalgamating the troy and avoirdupois weights, while they show the natural desire to retain, if possible, the best parts of either system, show also the difficulty of accomplishing this end.

“So the two systems are pitted against one another ; compromise is found impracticable, the contest is a struggle for existence, a war of extermination, which must end in the annihilation of one or both of the competitors.”

Mr. Proctor, after suggesting still another modification of these ill-assorted rivals, based upon the Irish system, (increasing our present grain about one eightieth) thus adverts to the report on weights and measures published in the Proceedings of the *American Pharmaceutical Association* for the year 1859.

“The proposition of the American Pharmaceutical Association, unquestionably the most carefully considered, the most elaborate, and most ambitious of the proposed plans, is based on the belief, and I think I may say the well-grounded belief, that for all practical purposes, counting by eights has the greatest sum of advantages. It is founded, like the metrical system, on geometrical measurement, a sextant of the equator being 8 times divided by 8, to give their module or radical measure of length ( $15\frac{2}{3}$  inches); the cube of this measure gives the root of the table of capacities, under the name of modius. The weight of a modius of water gives the pondus, or root of their system of weights.

This octonary system cannot be regarded as a proposal for the reformation of the weights used in pharmacy ; but for revolutionizing the whole system of metrology. It does not harmonize with any other system, and its advantages would be materially reduced if it met with only partial adoption.

The compilers of the British Pharmacopœia have shown their skill in evading a difficulty which they could not overcome. They were bound to use such weights in the work as would not be liable to be misunderstood ;

they have therefore adopted avoirdupois ounces and pounds, which are in general use both in Great Britain and Ireland, and troy grains, which are also now used in both islands. Drachms and scruples, which have a different value on the two sides of the Irish Sea, are not used in their formulæ nor acknowledged in their table, and their disuse is recommended. But this recommendation is not likely to be followed; drachms and scruples will still be used, and will have different values in the sister isles, so the difficulties will continue until a more potent remedy is discovered."

Having thus referred to several of the proposed schemes of amendment, Mr. Proctor judiciously observes that the comparative merits of these varying projects, can only be considered with reference to the circumstances under which they are to be adopted, or the conditions intended to be fulfilled. And he contemplates the subject under these several points of view.

"First, supposing that we have to reform pharmaceutical weights without changing any other system now in use. Secondly, supposing we have to arrange a system of weights and measures for general adoption in Great Britain. Thirdly, supposing we have to contrive or select a system most complete in itself, and consequently most deserving of universal adoption, without reference to any systems at present existing."

"Under the circumstances first supposed, we have to provide a system convenient in itself, harmonizing, as nearly as may be, with troy or avoirdupois weights, especially the latter, bringing into coincidence our weights and measure of capacity, and involving in the change as little trouble and risk, with as little ambiguity as possible. These requirements appear to be most nearly met in the propositions of Mr. Bell, Dr. Wilson, the Irish system, and the modification of the Irish system, which has been pointed out above."

The writer is disposed to regard this last as involving the least inconvenience, and as being "the most advantageous change which the pharmaceutical body could make in their weights and measures."

"Secondly, supposing we have to select a system which shall be used for all purposes throughout Great Britain, there is *not the same necessity* that it should harmonize with the troy and avoirdupois weights, though a simple relation between some prominent weight in each is desirable as a means of converting quantity of one scale into quantity of the other. *There is more need* that it should harmonize with the weights and measures of other countries; there is the same necessity that weights and measures should correspond with one another; also in this case the harmony with our arithmetic, and the abstract convenience of the system must have a larger share of our attention. The ultimate decision of the

question depending upon the comparative importance we attach to these several considerations."

And in this connection the writer comments on the decimal scales of weight and measure proposed by Mr. Griffin, and by Mr. Warrington, and on the whole gives the preference to the French metrical system.

"The octonary system of the American Pharmaceutical Association, the only one which can be said to compete with the metrical in regard to completeness and uniformity of arrangement, is also the only one which can compete with it as a plan for universal and permanent adoption. The existence of this rivalry is my strongest inducement for delaying the recommendation of any great change till the merits of octavial, decimal, and it may be also of duodecimal systems have been fully canvassed, and for recommending that the reform of British metrology should, for the present, be limited to such changes as could without great difficulty, be made in the existing weights and measures, and would render them harmonious and unequivocal. It is on this ground that the modification of the Irish system, which I before suggested for the reform of pharmaceutical weights, I would now recommend for general national adoption—not as an institution to be unchangeable in future ages, but as a simple alteration which could free us from all the great evils of our present want of system, and enable us at a future time, to adopt any better arrangement with greater facility than at present.

Turning to the third case supposed—that is, that we have to contrive or select the best system possible, without reference to existing customs, which may give a temporary and unreal advantage to those which are made to suit present circumstances. The systems to which I shall draw attention, as suited for this purpose, are the metric-decimal and the American octavial.

The advantages of a decimal system are simply that it brings the tables of weights and measures into accordance with our modes of expressing number, every *place* giving a value to the number which occupies it; so that if several numbers are placed together, each has, in virtue of its position, ten times the value of that to the right-hand of it, and one-tenth of the value of that at the left; and these positional values are multiplied by the value of the digit which occupies the place.

Looking to pharmaceutical practices for evidence regarding the comparative utility of decimal or octavial scales, we find a general preference for the latter. Concentrated infusions and decoctions are made, so that one part equals eight of the normal strength. The great majority of bottles used for dispensing, etc., are founded upon octavial numbers of ounces. 1, 2, 4, 6, 8, 12, and 16 are the current sizes. 20 ounces are not frequently used, 10 ounces still more rarely, and five ounces quite unknown. Looking at the posological table in 36 cases



taken at random, [comparing the minimum dose with the maximum]  
 . . . there are 21 instances in which the octavial scale would most readily meet the wants of the case; 15 in which duodecimal would have the advantage; but no instance in favor of the decimal,—no doubt, because the decimal scale does not so readily express these simple relationships.

Taking at random 22 prescriptions, I found the relation between the separate ingredients, and the total quantity to be of an octavial nature in 32 cases, to be of a duodecimal nature in 10 cases, and of a decimal character in only 1. I found the total quantity, estimated as a multiple of the smallest ingredient, was 13 times octavial, 6 times duodecimal, and only one decimal. I found the number of doses ordered was 9 times octavial, 6 times duodecimal, and only 1 decimal.

The division of paper into pages for a book is almost necessarily done by binary or ternary folding; we have folio, quarto, octavo, etc., and duodecimo, but no division by tens.

The mariner's compass is necessarily divided by fours and powers of fours.

Many other instances might be adduced in which the natural process is evidently doubling and halving repeatedly performed; but I do not know of any instance in which division or multiplication by 5 or 10, is by the force of natural circumstance a matter of necessity. This repeated halving, a matter of necessity in some cases, a matter of convenience in others, has become a matter of habit in almost all. To adapt our weights and measures to this fact, is to adapt ourselves to our circumstances, and work in harmony with natural laws. To establish a system which does not afford facilities for this natural process is to work in ignorance of natural laws, if not in direct opposition to them; and nothing established upon such a foundation can be eminently convenient, or permanently successful.

Having now discussed the relative merits of octavial and duodecimal division; and having in my former paper pointed out what I considered the principal failings of the metrical system, I have now only to point out those particulars in which I think the American octonary scale may be advantageously modified.

There is no great advantage in deriving a system from a natural standard; and if the standard weights or measures are to be repeatedly derived from the so-called natural source, they will be liable to variation, either from the 'natural source' itself varying, as in the case of the foot; or our estimate varying, as in the case of the metre, the pendulum, or the cubic inch of water."

Granting the full force of what the writer then proceeds to urge—to wit, that a "standard of weight defined by a certain piece of metal or other durable substance," (as adopted by the

Commissioners appointed by the British Government to report upon standards,) will always have an accuracy of ascertainment far within that of the best determination of a cubic measure of water,—we still think that this “certain piece of metal,” selected for the standard, should not be arbitrarily assumed; but should always be brought into unison with a “natural” standard with all the accuracy attainable. To say nothing of the advantage of a very closely approximative restoration of a *lost* standard,—thereby rendered possible,—the practical conveniences of precise geographical factors, and of simple and direct relations between lengths, weights, and measures of capacity, are certainly too obvious and too great to be lightly thrown away. Thus where we are furnished with a bushel, the root of whose cube is precisely the measuring rule in common use, (one of the many advantages which result from an octonary scale of weights and measures) the benefit is by no means a trivial one that the farmer can always without any calculation make himself a cubical box, (whether to supply, or to verify a measure,) whose capacity shall be fully as accurate as the “bushel” he may purchase,—even admitting that such a process may not have the precision that would satisfy the experimental philosopher. And this is a benefit which would attach equally to every unit of measurement in the scale. Whenever so radical a change is contemplated as the introduction of new divisions or denominations of measure, the importance of adopting at the same time the most useful or convenient standards that can be devised, is too eminent to justify a moment's hesitation in throwing aside every thing that has not some *intrinsic* value to plead for its preservation.

“If we accept the modified avoirdupois weight as a transition scale, the pound would naturally become our root, both of weight and capacity; and the inch or foot would be a suitable root for lineal measure, which would have the advantage of preserving a convenient relationship, and mode of converting the old quantities into the new notation, and would enable us to continue the use of established rules for converting bulk of various materials into weight.

The report of the American Pharmaceutical Association speaks approvingly of the practice of calling new weights by old names. I must express my disapprobation of such a practice. I think one of the weak points of their scheme is the calling 34 ounces a pound,  $4\frac{1}{4}$  ounces an

ounce, and  $\frac{1}{2}$  ounce a drachm; their proposed pint is 41 ounces, and their gallon  $16\frac{1}{2}$  imperial pints."

That there are very serious inconveniences attendant upon the employment of equivocal terms, or of denominations having different values, cannot be denied. It is one of the penalties of an erroneous system, that in the transition to a better one, there is danger of confounding the "old style" with the new. The adoption of the reformed Gregorian calendar is a notable illustration of this. It would perhaps be much better and safer, if reformed standards, could always be established with their own appropriate and distinctive nomenclature; but all experience has shown that this is just the part most difficult of a popular establishment. The continued inconvenience therefore of having a new-style "pound" and an old-style pound merely as the transitional confusion in leaving a bad system for a good one, appears to us to be by no means so great as that we are now enduring in the actual co-existence of two incongruous "pounds."

Mr. Proctor concludes his interesting report with the suggestion that an octonary scale of weights and measures would be very simple even in the presence of a decimal arithmetic; and that it would perhaps furnish the easiest introduction to a general numeration by eights.

"On the adoption of the octavial weights, measures, and money, the figures 8 and 9 would fall into comparative disuse; the former being expressed as "1" of the higher order, thus, 1 0; and the latter as one of the higher order *plus* one, thus, 1 1; this would be the first step towards octavial numeration, if it was found desirable."

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## PRACTICAL OBSERVATIONS ON THE MANUFACTURE OF OLEUM ÆTHEREUM.

BY C. LEWIS DIEHL, JR.

During the manufacture of *Oleum Æthereum*, the operator frequently meets with difficulties which are in a great measure inexplicable. With a view to alleviating these to some extent, the writer offers this paper as the result of his experience, and hopes that it may lead to further investigation by more experienced operators.



On commencing the manufacture of Oleum Æthereum, the writer had no practical experience to guide him, and, of course, had to rely on the observations and experience of others for information. Among others, the papers of Dr. E. R. Squibb, *Journal of Pharmacy*, vol. v. 3d series, p. 194, and *Proceedings Am. Pharm. Association*, 1860, were found to give the most explicit information on the subject, and served as a guide for the comparison of results.

At the U. S. Army Laboratory, Philadelphia, the manufacture is carried on in glass retorts of the best French make, and of a capacity of seven to eight gallons. They are heated by means of a sand bath fifteen and a half to sixteen inches in diameter and twelve inches deep; the depth of the sand under the retorts is never more than half an inch, and does not come up on the sides of the retort more than about five inches. This facilitates the cooling of the retort in case it is desirable. The mixture introduced into the retort consists of equal measures of 95 per cent. alcohol, and sulphuric acid, sp. gr. 1.845, care being taken to allow all the sulphate of lead to separate before introducing the mixture. The charge for a retort of seven gallons capacity is six and a half gallons; the refrigeration is effected by means of a large Liebig's condenser, and the distillate is collected in a tubulated receiver, which is so arranged that the distillate will enter through the tubulure, and the incondensable gases will pass through a tube, connected with the large end of the receiver, into the chimney. The joints are made air-tight by means of cork and India-rubber tubing. The sand baths can be heated in a very short space of time, the furnace being of an excellent construction, and the flues of which make a complete circle around the sand bath before entering the chimney, with an excellent draft. It is necessary to give a detailed description of the apparatus employed to permit of a thorough appreciation of the difficulties experienced at the laboratory.

At the suggestion of Prof. J. M. Maisch, of this laboratory, an accurate account of the temperatures at which the distillation proceeded from hour to hour, during the day, was kept



for some time, with a view of ascertaining at what temperature the yield of heavy oil of wine was most abundant, and also to decide whether the troublesome frothing could be regulated, and how far it was influenced by the temperature.

The following table is compiled from a series of observations as to temperature, collected during a period of three months, and represents a fair average of results.\*

NUMBER.	Amount of mixture used.	Temperature at 9 o'clock.	Temperature at 10 o'clock.	Temperature at 11 o'clock.	Temperature at 12 o'clock.	Temperature at 1 o'clock.	Temperature at 2 o'clock.	Temperature at 3 o'clock.	Temperature at 4 o'clock.	YIELD.
	Galls.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	oz.
1	6½	287	290	*307	298	284	289	*304	276	5½
2	6½	160	261	*303	*307	*313	297	282	.....	5½
3	6½	178	*307	*306	*306	*302	297	*306	298	5½
4	6½	174	298	*307	*306	*307	291	*316	*304	4½
5	6½	190	289	*313	.....	.....	.....	.....	.....	4½
6	6½	164	.....	299	*310	*306	.....	.....	.....	4½
7	6½	198	*310	*305	*314	293	*306	294	275	4½
8	6½	116	276	298	*300	*304	296	*309	293	4½
9	6	150	230	289	*301	292	288	*300	296	3½
10	6½	148	237	288	*302	293	298	293	*306	3½
11	6½	156	295	*308	*303	296	*307	*303	290	3½
12	6½	108	276	*302	298	*300	299	290	294	3½
13	6½	128	*300	296	287	288	207	251	.....	2½

In case of No. 5, the liquid frothed and boiled over between 11 and 12 o'clock. In that of No. 6, it boiled over between 1 and 2 o'clock.

It will be observed from the above table, that the results were very variable; yet they indicated that the quicker the temperature is brought to 300° F., and the longer it is kept above that point, the larger will be the yield. Nos. 3, 2 and 4 will fully explain the advantage of heating quickly and keeping up the temperature, while the numbers from 9 to 13 will show the disadvantage of a low temperature. Number 1 is the only instance that came to notice in which a low temperature gave a good yield.

As regards the frothing, no very satisfactory conclusions

\* In this and the following table all temperatures of 300 and above are marked \*.

could be arrived at from merely watching the temperature. In the cases of Nos. 5 and 6, the temperatures had been brought to  $310^{\circ}$  and above at the first heating. It was therefore thought necessary to prevent the heat from rising above  $305^{\circ}$  at the first heating. But, from results since obtained, it was observed that the temperature could frequently be raised to  $315^{\circ}$  and over, without frothing. For this reason the frothing was chiefly attributed to other causes, in conjunction with the temperature, and it was concluded, that where temperature alone could be held accountable for the frothing, it was generally above  $320^{\circ}$ . The presence of sulphate of lead may be mentioned as one of the principal causes of frothing, and this has been already observed and fully appreciated by Dr. Squibb, (see *Journ. of Pharm.*, vol. v. 3d series, p. 197). Other circumstances, however, appear to effect the same results. During the latter part of the distillation, copious quantities of a black matter (thiomelanic acid) are formed, which when the distillation has proceeded properly, forms a thick crust on the top of the liquid in the retort. A portion of this will frequently coat the walls of the retort, and is, in most instances, readily removed with a sponge and water or alcohol. Sometimes, however, it will adhere pertinaciously to the bottom, and can only be removed with great difficulty. When this is allowed to remain, it will almost invariably cause frothing, and, in many cases, boiling over. This can be avoided by cleaning the retort with sand and a little ether. It is generally recommended to allow the mixture of alcohol and sulphuric acid to stand twenty-four hours before using it, for the purpose of getting rid of the sulphate of lead. In the writer's experience, this time is not long enough when large quantities are used, from two to three days being necessary.

The following table has been collected from observations made since the first series of distillations, and may merit some attention :

NUMBER.	Amount of mixture used.	Fire lighted.	Reached the temperature of 300°.	Highest temp. observed.	Lowest temp. observed.	Temp. at six o'clock p.m.	No. of times reheated.	Boiled over at	No. of hours distilled.	Yield.
	Galls.			° F.	° F.	° F.				02.
1	6½	8 A.M.	10.15 A.M.	*315	.....	.....	1	11.40 A.M.	3.40	43½
2	6	8 "	11.30 "	*318	.....	.....	2	.....	10	6
3	6½	8 "	10.20 "	*318	290	280	2	.....	10	6½
4	6	8 "	10.40 "	*314	290	*315	3	.....	10	6½
5	6½	8 "	9.45 "	*322	.....	.....	1	4 P.M.	8	5½
6	6½	8 "	10.35 "	*322	.....	250	2	.....	10	6
7	6½	8 "	11.50 "	*318	.....	298	1	.....	10	5
8	6½	8 "	10.10 "	*326	.....	294	2	.....	10	6½
9	6½	8 "	10.35 "	*336	.....	.....	2	.....	16	5½
10	6½	8.30 "	9.55 "	*312	.....	298	2	.....	9.30	5½
11	6½	8.30 "	10.10 "	*316	.....	290	1	.....	9.30	5
12	6½	7.30 "	9 "	*316	.....	.....	2	3.50 P.M.	8.20	5½
13	6½	7.30 "	9.30 "	*314	.....	.....	1	.....	10.30	5½
14	6½	8 "	9.40 "	*318	.....	290	3	.....	10	7½
15	6½	8 "	9.50 "	*316	.....	*310	3	.....	10	6½
16	6½	8 "	9.30 "	*320	.....	*302	2	.....	10	6½
17	6½	8.15 "	10.5 "	*316	.....	*300	2	.....	9.45	4½
18	6½	8 "	10.5 "	*320	290	*305	2	.....	10	6½
19	6½	8 "	10 "	*322	294	.....	1	2.20 P.M.	6.20	5
20	6½	8 "	10.25 "	*322	290	284	2	.....	10	6
21	6½	9 "	11.30 "	*322	.....	.....	2	.....	9	5½
22	6½	11.30 "	1.45 P.M.	*328	*300	*310	2	.....	9	7
23	6½	12 M.	2 "	*311	*300	*302	2	.....	9	7
24	6½	11.30 A.M.	1.20 "	*312	*300	.....	3	8 P.M.	8.30	7
25	6½	11 "	2 "	*318	.....	.....	2	.....	10	7½
26	6½	1.30 P.M.	3.30 "	*317	.....	.....	2	.....	10.30	5½
27	6½	8 A.M.	10.20 A.M.	*314	290	*315	2	.....	10	6
28	6½	8 "	10.20 "	*322	294	.....	2	2.30 P.M.	6.30	6
29	6½	8 "	10.10 "	*320	*300	*310	2	.....	10	6½
30	6½	11.20 "	1.25 P.M.	*312	*300	.....	2	.....	10	6½

It is to be regretted that the table could not be kept more fully, but during the rush of business at the time this was impossible. Sufficient, however, has been collected in it to justify the conclusions that have been drawn. The chief points of interest in the table are—

1. The time at which the temperature reached 300°;
2. The highest temperature attained;
3. The lowest point the temperature fell to after it had reached 300°;
4. The number of heatings it was subjected to;

5. The temperature at 6 o'clock, P. M..

6. The yield.

The management of the fires in the foregoing operations was such that the temperatures would rise rapidly to about  $295^{\circ}$ , the draft door was then closed until  $300^{\circ}$  to  $305^{\circ}$  were reached, when the fires were dampened by means of ashes. The temperature would then generally rise from  $310^{\circ}$  to  $315^{\circ}$ . As soon as the temperature had fallen again to between  $300^{\circ}$  and  $305^{\circ}$ , heat was again applied until it began to rise, when the fires were again dampened; the temperature would then again rise and reach sometimes as high as  $320^{\circ}$ . The management of the heat requires great care and constant attention, for, if the fire is kept strong until the temperature reaches  $310^{\circ}$ , the liquid in the retort is very apt to froth over. In managing the fires, the operator should be able to raise the heat or withdraw it at very short notice. To this end it is best to work without the dampers; all that is necessary when the fire is to be dampened, will be to close the draft door, open the fire door, and cover the live coal with coal if the fire is moderate, or with ashes if it be very strong. The advantage of keeping the damper open will be obvious here, for a cold draft will enter at the fire door and cause more rapid cooling. The fire can be raised again at short notice by opening the draft door and closing the fire door.

The formation of a crust on the top of the liquid in the retort is considered favorable to the distillation, as it appears to prevent the frothing up almost entirely. In one case (No. 9, table 2) the temperature had attained  $336^{\circ}$  without causing frothing over, while in other cases where the crust had become accidentally broken and the temperature was much lower, the liquid frothed over like a flash, scarcely leaving time to save the distillate. In all cases, except the last-mentioned, the frothing takes place slowly, affording ample time to make the proper disconnections. The froth was generally allowed to rise within one-half inch of the neck before the connections were loosened, and the retort was not entirely disconnected until it began to enter the neck. It was observed that if the



bubbles thrown up during the earlier period of the distillation were very small, the liquid was very apt to froth; if, on the contrary, the bubbles were large, this seldom happened, and, in fact, in the only cases where it did so, the cause could be traced to high heating. It is well, therefore, to watch the retorts very closely, and to manage the fires carefully when the boiling takes place in small bubbles. The temperature should, however, in no case be allowed to fall below  $300^{\circ}$ , even if it is at the risk of frothing, for very good yields have been obtained where frothing occurred.

The distillate obtained generally consisted of two layers; the heavier containing water saturated with sulphurous acid, the lighter consisting of an ethereal solution of oil of wine. Occasionally, however, the positions were reversed, the solution of oil of wine taking the lower stratum, while the watery liquid occupied the upper; and several instances have occurred when three layers were formed, the upper and lower consisting of solution of oil of wine, while the centre was occupied by the watery liquid. The oil of wine was separated from its solution by exposure to a dry current of air for from twelve to twenty-four hours. The liquid was then found to have separated again into two layers, and was mixed with about three times its volume of distilled water, transferred to a separatory funnel and allowed to remain at rest for several hours. The oil was then drawn off and the process of washing repeated until it no longer affected litmus.

Oil of wine, as thus obtained, is a limpid, oily liquid, of a pale straw color, having a pungent and aromatic taste, and an odor reminding of the artificial fruit essences. No very accurate examinations as to specific gravity were made. In three cases noted, they were respectively 1.065, 1.095, 1.100, and, as far as recollected in a number of other cases, they ranged between 1.080 and 1.100.

On the basis of the foregoing observations, it may be convenient to state, in a more condensed form, the precautions necessary in the distillation of heavy oil of wine.

“The retort should be set in a sand bath with but a thin

layer of sand under it, and but a few inches up its sides, which facilitates its rapid cooling when desired.

"The fires should be managed without the damper; all that is necessary being to close the draft door, open the fire door, and cover the fire with coal or ashes, according to circumstances.

"The presence of sulphate of lead in the mixture, or of thiomelanic acid on the sides of the retort, has a tendency to cause frothing, and should be avoided.

"The temperature should be raised rapidly to  $300^{\circ}$  or  $305^{\circ}$  F., after which the fire is immediately to be dampened. If the fire has been very strong, it should not be raised above  $300^{\circ}$ ; if only moderate, it may be raised to  $305^{\circ}$ . The temperature will then generally rise spontaneously to from  $310^{\circ}$  to  $315^{\circ}$ .

"The temperature should be kept above  $300^{\circ}$  as long as possible, and this may be done by re-heating as often as it falls to near  $300^{\circ}$ . As soon as the temperature begins to rise again, the fire must be dampened; for, if the heating be continued until the temperature reaches  $310^{\circ}$ , it is very apt to rise above  $320^{\circ}$  and cause frothing. It should always be avoided to raise the temperature above  $320^{\circ}$ , as the yield of oil of wine is not increased by raising it above that point, and it is more apt to cause frothing,

"If the liquid froths, the first step must be to pull the fire out of the furnace and then fan the retort vigorously, which frequently prevents frothing over."

In conclusion, it may not be uninteresting to give an account of the results of three months' distillation, from March 17th to June 17th.

The total amount of sulphuric acid used was 5485 lbs.; of alcohol, sp. gr. .809, it was  $367\frac{3}{4}$  galls. This yield was  $558\frac{1}{2}$  oz. avoirdupois, making one ounce of heavy oil of wine to every 70 ounces by weight of alcohol and 157 ounces of sulphuric acid used. The number of days on which distillation was carried on is fifty-four, during which time one hundred and two distillations were made. Of these, fifteen frothed over, out of which three distillations were lost, leaving ninety-nine distilla-

tions from which yields were obtained, and making the average yield from each retort 5.52 avoirdupois ounces.

From an article by Dr. E. R. Squibb, *Proceed. Am. Pharm. Association*, 1860, the following yield is taken to compare the yield at the U. S. A. Laboratory,—viz.:

The amount of sulphuric acid used was 1664 lbs.; the amount of alcohol was  $100\frac{1}{2}$  galls. = 668 lbs. The yield was 87 fluidounces, which, calculating the sp. gr. of the oil at 1.1, is about 96 avoirdupois ounces. The number of distillations was twenty-one, making an average for each distillation of 4.14 fluidounces, or 4.54 avoirdupois ounces. To make one avoirdupois ounce it required 111 ounces of alcohol and 173 ounces sulphuric acid sp. gr. 1.854.

The following table will plainly show the difference of results:

	Dr. E. R. Squibb.	U.S.A. Laboratory.
Amount of sulph. acid required to make one avoirdupois ounce of oil of wine .....	173 Avoird. ounces.	157 Avoird. ounces.
Amount of alcohol required for the same.....	111 " "	70 " "
Average yield from each distillation .....	4.54 " "	5.52 " "

*Proc. Amer. Pharm. Assoc.*, 1864.

## ON SOUTHERN PRICKLY ASH BARK.

By PROF. ROBERT BRIDGES.

Among the questions proposed during the session of the American Pharmaceutical Association for 1862 is the following: "What is the true botanical source of Southern Prickly Ash Bark;" which was accepted by Professor Thomas, and on the next meeting, at his request, "dropped for the present." Professor Thomas had, in the mean time, however, endeavored to obtain specimens for the purpose of investigation, but without apparent success. One of his friends, to whom he subse-

quently applied in January of this year, was enabled to obtain, at Beaufort, S. C., branches of the prickly ash, and transmit them to Philadelphia, at which place they arrived a short time after Dr. Thomas' decease. On the specimens coming, with the private cabinet of their late Professor, into the possession of the College of Pharmacy of Philadelphia, the Board of Trustees of that institution requested Professor Bridges to take charge of the specimens, and transmit an answer to question eleven of 1862, to the American Pharmaceutical Association at their next meeting in September.

The specimens were collected by Mr. W. Heyser, a graduate of the School of Pharmacy, who, in an accompanying note, says, "*Aralia spinosa*, or a plant I shall call that, is very abundant on the *Sea Islands*. *Zanthoxylum Carolinianum*, called by the negroes 'toothache bush,' is also abundant. This is, I think, *Z. tricarpum* of Elliot's old botany."

That Mr. Heyser has correctly assigned the "Southern Prickly Ash" to its true botanical source, if this name be confined to the product from the continent, and not extended to that from the West India Islands, will be evident from the following observations:—Professor Asa Gray, the standard authority for North American botany, in the "Flora of North America," separates the Northern and Southern species of *Zanthoxylum* into two subgenera, the latter distinguished by the name *Ochroxylum*, and the species *Carolinianum*, this being the name first applied to the plant. Lam. Dic. 1786, ii. p. 40. As synonymes he gives *tricarpum*, Mich. Pursh. Elliot, *fraxinifolium*, Walter. In "The Natural History of Carolina, Florida and the Bahama Islands, by Mark Catesby, F.R.S.," is a very graphic description of the "*Zanthoxylum Spinosum*," &c., at p. 26. "The Pelitory or Toothache Tree. This tree seldom grows above a foot in thickness, and about 16 feet high. The bark is white and very rough. The trunk and large limbs are, in a singular manner, thick set, with pyramidal-shaped protuberances pointing from the tree; at the end of every one of these there is a sharp thorn. These protuberances are of the same consistence with the bark of the tree, of vari-



ous sizes, the largest being as big as walnuts. The smaller branches are beset with prickles only."

The only species with which this may be confounded is the "*Z. Clava-Herculis*," a native of the West India Islands. Hans Sloane (Voyage to the Islands of Madeira, &c., and Jamaica, vol. ii. p. 28,) under "xxii. *Evonymo affinis Arbor Spinoso*," &c., describes this species as "one of the largest and tallest trees in the Island," (Jamaica.)

"It has a gray and whitish colored bark, smooth only here and there along the trunk, having long obtuse prickles like cocks' combs; the branches are forty and more feet in height, and are all beset with short crooked prickles."

James Macfadyen (The Flora of Jamaica) gives, with the exception of the size of the tree, a similar description,—"*stem erect, armed with numerous, strong thick spines or prickles; branches spreading, thorny.*" From these accounts there are no means of distinguishing the two species in the absence of the leaves; and as these, from the branches being collected in January, did not accompany the specimen, it is necessary to seek further for distinguishing marks. In the "*Histoire Naturelle des Vegetaux*, par M. Edouard Spach, vol. ii. p. 365, these two species are described as follows:

"*Z. Clava-Herculis*. Aiguillons courts, geminees, enlartis a la base.

"*Z. tricarpum*, Mich. Catesby, t. 26. Branches elatées armées des nombreux aiguillons tres-pointus, fortement dilates a la base, atteignant quelques fois une pouce de diametre."

Dr. Julius Martigny and also Mr. J. Dyson Perrins, speaking of the bark of *Clava-Herculis*, describe it as peculiar from its highly laminated structure, splitting up like bast. We have here then two characters in *Clava-Herculis* not to be found in *Carolinianum*, viz., "*aiguillons geminees*," and a bast-like structure of the bark; and if we have in addition the locality from which the bark has been derived, a correct opinion of the botanical source may be formed, there being no evidence that *Clava-Herculis* is a native of the continent, or *Carolinianum* of the islands. In relation to *Clava-Herculis*, Elliot expressly

states, "With this species I am entirely unacquainted. Does it not really belong to the West Indies? The Hercules club of our negroes and countrymen is, as far as I have been able to ascertain, the *Aralia Spinosa*."

The specimens sent by Mr. Heyser, and portions of bark (derived partly from an older tree) in the cabinet of the College, agree so well with the characters given by Catesby and Sloane, that but few additional remarks are required. The Beaufort specimens consist of branches varying from three inches to three lines in diameter. The bark adheres strongly to the wood, is thin and brittle, and the protuberances on the large branches are surmounted by the remains of the thorns. The thorns on the young branches are of a brown color, shining, very sharp, mostly straight, with a large base. On the large branches they appear weathered, having lost their color, polish and acuteness. In the bark of greater age, the spines are lost and the protuberances alone remain. These appear to be formed of successive annual layers of corky substance, gradually increasing in diameter towards the base, which is sometimes nearly diamond-shaped, the longest diameter most usually longitudinal to the branches, but occasionally transverse. In thickness the bark (College specimen) varies from that of writing paper to one-sixth of an inch. Its pungency is greater than that of the Northern prickly ash.—*Proc. Amer. Pharm. Assoc.*, 1864.

#### IN REGARD TO THE PRESERVATION OF GARLIC.

By A. P. SHARP.

In accepting this query it was not with the expectation of making any extensive experiments in regard to the subject referred to, but more especially to propose to the Association the plan I have pursued for some years to protect the bulblets against the germination which is so fatal to the virtues of the plant as a medical agent. At the proper season I carefully select the quantity needed, and after depriving them of their superfluous leaves, stems, &c., place them in a bottle which is securely closed with either glass or cork stopper, and pour upon them a small

portion of alcohol, say about two ounces to a quart jar. The vapor of the alcohol is soon absorbed by the bulbs, and, so far as my experience goes, entirely destroys all their vitality; hence, all tendency to germinate is destroyed, and in this manner the article under consideration can be kept (as I have done) for years, and at the same time its virtues apparently maintained to the last so far as smell, taste, &c., goes to prove it.—*Proc. Amer. Pharm. Assoc.*, 1864.

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## BITTER WINE OF IRON.

BY JAMES T. SHINN.

Preparations of bitter tonics in wine, and of iron in the same menstruum, have been in use for many generations, and various formulas for making them are to be found in old medical works. In "The Complete English Dispensatory," published in 1730, by John Quincy, M. D., quite a number are given for Vinum Ferri, Vinum Chalybeatum, Vinum Amarum, &c., but none combining the iron and bitters, though in some remarks on the medical properties of wine of steel, it is stated to be very efficacious when given with the stomachic bitters; it is also recommended to be mixed with wine of vipers, thereby increasing the effect, if not improving the taste; but this latter article is now scarcely to be found, save in some antiquated apothecary's shop window, and the human race is sufficiently tinctured with the old serpent without resorting to such an infusion.

Early in this century, Dr. Physick, of Philadelphia, prescribed a bitter wine of iron by macerating iron filings, gentian, orange peel and ginger in old cider, which, though containing but little iron in solution, was considerably used by the profession, and kept its popularity until within a few years; the tannin in the orange peel caused it to become quite dark in color, which detracted from its elegance as a preparation.

In 1841 M. Beral published some notices of various preparations of iron, including citrate of sesquioxide and of the magnetic oxide, and of one called chalybeate wine of quinquina, of which he says, "Composed of elements which were sup-

posed incompatible, this chalybeate wine constitutes a new medicine, the necessity of which is frequently seen, and which, in the hands of physicians, receives numerous useful applications. Fifty grammes of this wine contain one gramme citrate of iron, and the soluble principles of three grammes of quinquina; the quantity may be increased at pleasure."

The introduction into this city of a preparation combining the properties of cinchona and iron with wine, appears to be due to Peter J. Hassard, who, about five years ago, was requested by Dr. J. F. Meigs to make such an article; he, being familiar with the extensive use made by empirics of citrate of iron and quinine, prepared the bitter wine of iron by dissolving that salt in sherry wine, adding sugar and orange as flavor.

In the American Journal of Pharmacy for 1861, there was published a formula for "Hubbell's Bitter Wine of Iron," made with an extract of bark and citrate of the magnetic oxide of iron. ("This oxide does not form salts." Fowne.) As is remarked by Prof. Procter, only the salts of cinchona bark are contained in this preparation, and it would be equally effective and much more convenient for the apothecary to make it from the sulphates of quinia and cinchonia, which are always in his shop.

Upon inquiry among several of the leading pharmacutists of Philadelphia, I find much difference exists as to the mode of making "Vinum Ferri Amarum." Some only sell the old article of Dr. Physick; others use ordinary extract of cinchona bark and citrate of iron, adding citric acid to prevent blackening, or treating the solution of extract with carbonate of iron, and filtering out the tannate; while many dissolve the citrate of iron and quinine in wine. This latter salt, as found in commerce, is of uncertain strength, and objectionable on that account.

The points to be considered in devising a formula for bitter wine of iron are, efficacy, agreeability of taste and appearance, economy and convenience of preparation.

The salts of the cinchonas rank highest among the tonics, and the sulphate of cinchonia is considered by many physicians



quite as effective as the sulphate of quinia: in the Philadelphia Dispensary it is used altogether as a tonic and anti-periodic with complete success; and Dr. John Conrad, of the Pennsylvania Hospital, who has had extensive experience in regard to it, thinks it equally certain, when given in rather larger doses than the quinia. This being the case, economy would point to its introduction into the preparation under consideration, while the facility of manipulation with the salts instead of ext. of bark, and the elegance of appearance in the result, are additional reasons.

The following is a recipe by which I have made the article for a long time with satisfactory results, and combines to some extent the desirable points enumerated above:

Take of Sulphate of cinchona,	3vj.
“ of quinia,	3ij.
Citrate of iron,	3iv.
Citric acid	3j.
Sherry wine,	Oiv.
Alcohol,	Oj.
Orange syrup,	Oj.

Dissolve the sulphates and citric acid in a pint and a half of hot water, and the citrate of iron in half a pint of the same; mix the solutions, and add the other ingredients.

This contains about half a grain of the cinchona salts and two grains citrate of iron in each teaspoonful, and is much stronger in tonic power than most of the articles made by other apothecaries, and consequently is not quite so pleasant to the taste. It must be impossible to give cinchona or its salts in sufficient doses to be effectual without a decided bitterness, or at least no soluble preparation is now known that is free from such taste. The pharmacist who can show the physician a capital formula, and at the same time please the patient with an agreeable and attractive-looking medicine, is the one to succeed, but the two things are often incompatible with a strict observance of said formula.

The materials above given are on the shelves of every apothecary, and may be put together in fifteen minutes, forming an

agreeable remedy of pleasing appearance and tonic power. The proportions may be varied, and sherry wine used instead of part water, as also the officinal solution of citrate of iron, being careful to heat it before mixing with the other salts; but the formula as given fulfils, as near as may be, the conditions before mentioned of efficacy, agreeability, economy and convenience of preparation.—*Proc. Amer. Pharm. Assoc.*, 1864.

*Philadelphia*, 1864.

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GLYCERIN—ITS MISSION (SO TO SPEAK) AS A REMEDY,  
AS AN ADJUVANT AND AS A SOLVENT.

By W. J. M. GORDON, Cincinnati.

When I accepted this subject at the last meeting of the Association, I expected to have given it more attention than my time during the past year would permit. Not having investigated it as thoroughly as desirable, I will present what I have accomplished in connection with much that is not new, so as to present it as fully as possible, and leave it for the experiments and suggestions of all who may be interested in it.

Glycerin, it is generally known, possesses a wonderful range of solvent properties, dissolving many substances not soluble in alcohol or water. Its agreeable taste, harmless action upon the system and perfect assimilation with human digestion, specially adapt it when other substances would be rejected. Its sweetening property being almost equal to cane-sugar syrup, but differing from it in not being liable to fermentation; resembling oils, but, unlike oils, miscible with alcohol and water in any proportion; not volatile at ordinary temperatures, and not becoming hard at the freezing point of mercury. Possessing these properties, it cannot but be an article of importance both in pharmacy and in the arts.

The high price, heretofore, no doubt, has kept it from many uses to which it is now applied. Recently, glycerin, adapted to the various purposes to which it is extensively used, has been produced at a lower price than alcohol, sugar, or oil, which it has come in competition with, and which places, it

seems specially adapted to fill to a considerable extent; and the large amount and low price at which it can be produced, makes it worthy of attention at a time particularly when every article of utility should be carefully looked after.

Medicinally, glycerin has been used for its nutritive and alternative effect, and in some cases with marked success, being admissible when cod-liver oil and other unpleasant substances would be rejected. These and its soothing effect in coughs, are the principal internal uses to which it has been applied alone. Its more important medicinal value is as a vehicle for the preparation of a great variety of remedies for both internal and external use.

It is a favorite article in combination with the hypophosphites, known as glycerole of hypophosphites, and, never disagreeing with the most delicate stomach, as sugar is liable to do, is admissible when syrup is not.

Iodide of iron prepared with it in the place of syrup, makes a handsome and permanent preparation.

Its preservative and solvent property being so much greater than that of sugar syrup, cannot fail to recommend it in the place of that substance for the preparation of ipecac, senega, hive syrup and such vegetable preparations as are liable to fermentation, specimens of several I now exhibit made with glycerin, costing \$2.00 per gallon, which are elegant in appearance, and will undoubtedly remain without change an indefinite length of time.

Its uses externally are numerous. For chapped skin and rough and excoriated surfaces, it has no equal; for sore nipples, skin diseases, ulcers of various kinds, to prevent excessive suppuration and cleanse the secreting surface.

It is highly recommended in deep abscesses with diseased bone, combined with iodine, which it dissolves. With many, it is a favorite mode of applying iodine and its salts.

It is used in cerates and ointments, which do not become rancid so soon when combined with it; as glycerole of lead, in place of Goulard's cerate, glycerin being used in the place of wax and oil; as glycerole of kino, which is said to be unchange-

able; in the preparation of lactucarium in a liquid form, by which its activity and reliability are more certain; as glycerole of aloes, tar and arnica for external use. It is used with starch in the proportion of 1 oz. of glycerin to 70 grs. of starch for making an article called "plasma," as a substitute for lard or cerate. And it no doubt possesses advantage in preparing vegetable extracts, such as belladonna, aconite and others for external use, as they can be readily mixed with it; for liniments, in the place of oil, as it will not become rancid; and has been suggested for the extraction of the active principles of vegetable substances in place of oil and fats, to be used in the preparation of cerates or ointments.

Incorporated with vegetable extracts, it will prevent mouldiness and keep them soft, and for pill masses liable to become hard it is a good addition. It may be used as an addition to poultices to keep them soft, or any article to be kept in a moist or plastic condition.

Its solvent and preservative properties are of great importance to the pharmacist. In the preparation of fluid extracts, it will be found to supply the place of alcohol and sugar to much advantage. My experience is such as to convince me that in most cases extracts will be more permanent by supplying the place of alcohol used to preserve them with glycerin. To fluid extract of Jalap, Veratrum viride, Cinchona aromat. and Iris versicolor, glycerin was added and all the alcohol evaporated out, specimens of which I now exhibit, presenting a handsome appearance. Sarsaparilla and those liable to fermentation will be much better preserved with it.

I have used glycerin as a menstruum in the preparation of extracts of cloves, nutmegs and Ceylon cinnamon, and the preparations are elegant representatives of the substances from which they were made.

It dissolves the vegetable acids, most of the vegetable alkalis, sulphuret of potassium, permanganate of potassa, sulphate of copper, zinc, iron and potassa, alkaline and some of the metallic chlorides;

Iodide of ammonium, cadmium, zinc, potassa, sodium, lime and manganese;



Freshly precipitated carbonate of iron ;  
Most of the metallic oxides to some extent ;  
Nitrate of potassa, silver, copper and lead ;  
Citrate of iron, citrate of iron and quinine, citrate of iron  
and strychnia, tartrate of iron and potassa ;  
Pyrophosphate of iron, and most saline substances.

Heating to give it greater fluidity will generally increase its solvent property.

It may not be amiss to name other purposes for which glycerin is largely used. Much the largest quantity used for any one purpose, except that of filling gas meters, is in the manufacture of hair oils, tonics and washes, for which it is admirably fitted, taking the place of alcohol and castor oil, which are now too expensive for the purpose, and by its undrying property keeping the hair moist in appearance.

It is largely used in tobacco, and is particularly adapted to the article known as fine-cut, preserving it in a moist state an indefinite length of time; and, unlike sugar, molasses and infusion of liquorice, which has been used for the same purpose, it will not turn sour, and is unchanged by exposure to the air.

Wine and liquor manufacturers use it to improve liquors, by giving body and removing the fiery taste.

It is used by manufacturers of woollen goods in place of oil, being more economical and not requiring soap to wash it out.

Manufacturers of cotton goods use it in size to prevent rapid drying.

Printers use it in place of molasses to make rollers, which will not dry and shrink.

It is used by artists in clay and plaster of Paris, to preserve it in a plastic form for modelling.

It is used in soaps.

For filling wet meters, used in measuring illuminating gas, it is now extensively used, and possesses decided advantage over whisky or any substance before used for the purpose. It is practically free from any objection, not evaporating at any ordinary temperature, and can be sufficiently diluted to prevent its absorption of more water from the gas, and not liable to

freeze at any degree of cold meters are subject to, and rendering them free from the attention necessary if filled with whisky or water.

It deserves attention as a lubricator for fine machinery, not congealing or being affected by exposure to the atmosphere.

Numerous other applications have been made of it, and its uses will increase as its wonderful properties become known.

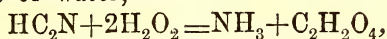
## ON THE PURIFICATION OF ESSENTIAL OIL OF ALMONDS.

BY WILLIAM A. TILDEN,

*Demonstrator in the Laboratory of the Pharmaceutical Society.*

Among the numerous processes that have been suggested for the purification of essential oil of almonds from the prussic acid that it invariably contains, I believe there are none that are completely satisfactory, and some short time ago I was induced to make a few experiments in a new direction, with a view to finding a process for the purification of this essential oil that should not be subject to the objections to which the others are liable. Although I believe I have been to a certain extent successful, I wish merely to present some suggestions in order that some one who may have opportunities of working on a larger scale may, if so minded, repeat my experiments.

I have several times made use of a process founded upon a long-known reaction, and which consists in splitting up the hydrocyanic acid into formic acid and ammonia with the assistance of the elements of water,—

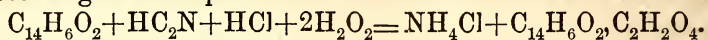


this change being effected by the action of a strong mineral acid.

Now when this decomposition is brought about in the presence of hydride of the benzoyl, formic acid is not set at liberty, but unites with the elements of the hydride, producing a conjugate acid, to which the name formo-benzoylic acid has been applied.

Its composition is represented by the following formula:— $\text{C}_{14}\text{H}_6\text{O}_2, \text{C}_2\text{H}_2\text{O}_4$ . This body is easily formed by boiling a mixture of the distilled water of bitter almonds and hydrochloric

acid, sal-ammoniac being, of course, at the same time produced according to this equation—



I imagined that if the formation of this substance, this acid, which of course takes a large proportion of hydride of benzoyl, could be prevented or diminished, this might prove a practicable process for the destruction of the hydrocyanic acid in the essence of almonds. I have not succeeded, by any means that I have tried, in preventing altogether the loss of hydride of benzoyl in this form, but I think it may be effected to a considerable extent. The method I have pursued is as follows:—The essential oil is mixed in a flask with about three times its bulk of ordinary hydrochloric acid diluted with a small quantity of water, a condenser attached, and distillation started. As soon as the oil begins to come over pretty freely, a quantity of water is added and distillation proceeded with. The oil is afterwards separated from the aqueous portion of the distillate; it is slightly acid, and to remove this a little piece of quicklime is put into it, which at the same time helps to dry the oil. If hydrate of lime be used for this purpose, the essence becomes slightly discolored.

Supposing the change represented in the equation above to take place strictly as there shown, a proportion of hydrocyanic acid in the oil amounting to 8 per cent. would cause a loss of no less than 31.4 per cent. of the hydride, in the form of the acid described; 5 per cent. of the hydrocyanic acid would remove 19.6 per cent. of hydride. Such a deficiency would be, of course, out of the question; but I have made in the manner described two rough quantitative experiments, and believe that the loss on the large scale would not amount to more than from 15 to 17 per cent., which would include hydrocyanic acid, benzoic acid, benzoine, and all the other impurities of the essence.

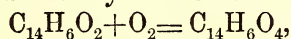
I now wish to describe another method, which was suggested at a meeting of the Chemical Discussion Association by my friend Mr. Broughton, and which had also occurred to myself, but at that time I had no opportunity of making the experiment.

Chemists have found that all the aldehyds with which we are acquainted form definite crystalline compounds with the alkali-

line bisulphites; hydride of benzoyl, possessing as it does the characters of an aldehyd, being, in fact, the aldehyd of the benzoyl series, is no exception to this rule.

If, therefore, the crude essence of almonds be shaken up with three or four times its volume of a tolerable strong solution of bisulphite of soda and then allowed to rest, the mixture becomes warm and the hydride of benzoyl is all converted into a crystalline mass, having the composition represented by the following formula,— $C_{14}H_5NaO_2, S_2O_4, 3Aq$ . These crystals removed from the mother-liquor, which should be preserved, drained, and dried at a very gentle heat, and then dissolved in water, carbonate of soda in excess added, and the mixture distilled, yield hydride of benzoyl in a condition of absolute purity. By this plan, theoretically speaking, there is no loss beyond the actual impurities of the crude substance. This is certainly a recommendation, but a little trouble is involved in the double operation of preparing the crystals and their subsequent decomposition.

Having obtained the purified essence of almonds by any process that is most efficient, another desideratum is felt in the difficulty of preserving it from undergoing that oxidation and change with which every one is familiar. By exposure to the air, as every one knows, absorption of oxygen occurs and the liquid hydride is converted into crystalline benzoic acid,—



and this change proceeds much more rapidly with the purified than with the unpurified oil.

For this defect there is a simple remedy, which I think is as efficient as anything of the kind can ever be expected to be. It is well known that in the presence of moisture oxidation is effected with infinitely greater facility than otherwise. Numerous examples of this may be easily adduced, but I can remember none more striking than the formation of rust upon the surface of iron. If then, the purified essence of almonds be perfectly dried by a lump of chloride of calcium introduced into it, the oxidation is retarded in a very marked degree. I cannot say that the essence attains the degree of permanence enjoined by the crude substance, but certainly the improvement is of the most decided character.—*London Pharm. Journal.*



ON THE KOLA-NUT OF TROPICAL WEST AFRICA, (THE  
GUREE-NUT OF SOUDAN.)

BY DR. W. F. DANIELL, F. L. S.

The seeds of the cola tree (*cola acuminata* R. Br.,) said the author, have been from time immemorial an important article of commerce among the natives of Central and Western Africa, and are to be found also in the markets of Fez, Tripoli, and other mercantile depots on the Mediterranean. The Portuguese merchants have always accepted the statement of the natives that the nuts are a luxury reserved for the chiefs and richer classes of natives, and are merely used as a means of rendering water pure and palatable; and thus never dreamt of the seeds containing a highly nitrogenised body. But the circumstances that all who can procure the nuts indulge in chewing them all day long, might have suggested that they contained something of much value, if not of actual necessity, in a country where animal food is scarce, and often difficult to procure. Dr. Daniell then proceeded to give an interesting account of the uses of the seed in aboriginal customs. It seems that when a trader visits a chief, the present of a few seeds from the latter conveys an assurance of welcome and protection. When sent as a present by one chief to another at a distance, the seeds are received as a sign of friendship, and the compliment is always reciprocated. In parts of the country where the kola tree is not indigenous, no business can be done with the higher classes without the gift of some of the nuts. Wives also are purchased with kola seeds; and the fetish man who raises the dead completes his charms with the offering of some of the seeds the deceased loved so much when alive. They are used, too, as propitiatory offerings to malignant spirits, and with peculiar customs to decide the question of peace or war between distant tribes. They are highly appreciated, too, as a gift on the departure of a guest for a long journey, in the course of which they are found of the greatest value in supporting strength and allaying hunger. The Portuguese, Dutch and English residents in Western Africa have adopted the use of the seeds, and now they seem to have become a necessity. They are not eaten at meals, but are carried in the hand, and fragments are chewed

at intervals, the pulp being spat out, and the soluble part only swallowed. The seeds have been supposed to possess the qualities of Peruvian bark; but the most prominent physiological effect of their use is insomnia, or want of sleep, and on this account they are used by the natives to prolong their orgies. The Portuguese have made a yellow dye from the seed. With regard to the name, it would seem that the seeds were originally called "Goro," or "Guro;" but the tribes of Western Africa, from a physical defect, are unable to pronounce the letter "r," for which they substitute "l," and among them the nuts are called "Kola," or "Gola," a name which has been adopted by the Portuguese. Dr. Daniell then gave extracts from the earlier African travellers, which showed that they had heard or become acquainted with the use and properties of the Kola seeds. Lastly, he stated that when on the Gold Coast in 1850 he suffered from a severe diarrhoea, for which the inhabitants were in the habit of employing a decoction of fresh seeds. He tried the remedy, and found that it deprived him of sleep. This led him to suspect the presence of theine in the seeds, and, when in Jamaica some years afterwards, he made some experiments to determine the presence, if possible, of this alkaloid. He did, in fact, obtain some crystals, which later researches have decided to be theine.

The reading of this paper was followed by a verbal account, by Dr. Attfield, of the results of his analysis of the seeds.—*Chem. News*, Feb. 10, 1865.

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#### DISCOVERY OF THEINE IN KOLA NUTS.

Professor Bentley said that he had been requested by Dr. Daniell to announce to the meeting that evening the important and interesting discovery of theine in the Kola nuts of commerce (*Sterculia acuminata*). Dr. Daniell had written to him as follows:—"My attention was directed to the peculiar stimulant effects resulting from taking a decoction of the seeds, in the permanent loss of sleep, which led me to infer from physiological induction that these seeds contained an alkaloid analogous to theine, and on a chemical examination with a view to

the discovery of that substance, I obtained a number of small silky, needle-like crystals, which proved to be that alkaloid. On my arrival in England, I placed in the hands of Dr. Attfield samples of the fragments of the nuts, stating that they produced theine, and wished him to test the validity of my conclusions. I am happy to state he has fully confirmed my discovery." Professor Bentley added that Dr. Daniell would read a paper on the subject at the next Pharmaceutical meeting, and also that Dr. Attfield would at the same time give the details of his analysis of Kola nuts. Professor Bentley thought it probable that the alkaloid thus obtained, from the near botanical affinity of the genus producing it to that from which cocoa and chocolate were obtained, might be theobromine instead of theine, although the appearance of the crystals, it must be admitted, was more that of theine.—*Lond. Pharm. Journal*, Feb., 1865.

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#### ON THE BOTANICAL ORIGIN OF GAMBOGE.

BY DANIEL HANBURY, F. L. S.

The botanical origin of Gamboge has been long involved in some obscurity, for although the drug was evidently produced by a plant of the genus *Garcinia* it has not until recently been possible, for want of good specimens, to determine the species.

Hermann, a Dutch naturalist of the seventeenth century, who resided in Ceylon, referred the origin of gamboge to two plants, one of which is known to modern botanists as *Garcinia Morella*, the other as *G. Cambogia*; and we have it, on the authority of Mr. Thwaites, Director of the Royal Botanic Garden of Peradenia, that the former is capable of affording a very good form of the drug, but that such is not the case with the latter. It is, however, well known that gamboge is not an export of Ceylon, but that it is a production of Siam, a country which is still nearly unexplored by the botanist. Whether gamboge in Siam was yielded by the same tree as that which affords it in Ceylon, was a question which could only be settled by a careful examination of good botanical specimens.

Some years ago Dr. Christison, of Edinburgh, received from Singapore specimens of a *Garcinia* cultivated there on the

estate of Messrs. D'Almeida and Sons, which *Garcinia* had been brought from Siam as the true gamboge-tree. Dr. Christison, whose account appeared in the "Pharmaceutical Journal" for November, 1850, found this plant to be nearly allied to the *G. elliptica* of Wallich, but to differ from that species in having male flowers *pedicellate*, instead of *sessile*. Desirous of carrying the inquiry a little further, and of attempting to set at rest the question of the origin of gamboge, I recently addressed myself to Messrs. D'Almeida, who promptly replied to my letter, and forwarded a jar containing numerous specimens of the gamboge-tree cultivated on their plantation at Singapore. These specimens I carefully examined, comparing them with published descriptions and figures, as well as with specimens contained in the herbaria of the British Museum, of the Royal Gardens of Kew, and of the Linnean Society, in which investigation I had the valuable assistance of my friend Professor Oliver. The correctness of Dr. Christison's observation respecting the pedicellate flowers was immediately obvious, and it was also evident that the plant, but for this character, bore a strong resemblance to *Garcinia elliptica*; we noticed further that it came equally near to the *G. Morella* of Desrousseaux. Under these circumstances we thought it desirable to obtain the opinion of Mr. Thwaites, who, besides being an excellent botanist, was familiar with various species of *Garcinia* in a living state, and especially with *G. Morella*. Mr. Thwaites, after examining specimens of the Singapore gamboge-tree, which we had sent to him in Ceylon, replied that the plant was, in his opinion, a form of *G. Morella*, scarcely differing from the Ceylon type, except in having pedicellate instead of sessile flowers. This opinion was completely in accordance with that of Professor Oliver and other botanists whose opinion I had asked, and I therefore felt warranted in bringing the plant before the Linnean Society, in whose "Transactions" a figure of it has been published, under the following name and synonyms:—

*GARCINIA MORELLA*, Desrouss., var. *pedicellata*.

*G. Morella*, Desrousseaux, in Lamarck's Encyclop. Méthod. Botan. iii. 701, pl. 405, fig. 2; Thwaites, Enum. Plant. Zeylan. i. 49.

*G. elliptica*, Wallich, Catal. no. 4869.

*G. Gutta*, Wight, Illustr. of Indian Botany, i. 126, tab. 44 (exclus. synon. Linnæi).



*Hebradendron cambogioides*, Graham, in Hooker's Companion to Bot. Mag. ii. (1836, 193, tab. 27).

Var.  $\beta$ . *pedicellata* ; floribus masculis pedicellatis (pedicelli ad 3 lin. longi.)

Messrs. D'Almeida informed me that the number of gamboge-trees cultivated on their plantation is twenty-eight, but that it might have been increased to thousands had any pains been taken to do so. The trees are from thirty-five to fifty feet in height, the largest having a circumference of three feet. They grow very luxuriantly, without any attention, on the slope of a low hillock. Gamboge has at various times been extracted from them, but rather, it would seem, as an object of curiosity than for the purposes of commerce.—*Pharm. Journ.*, Jan., 1865.

#### GROWTH OF THE BALSAM OF PERU TREE.

Seeds of the Balsam of Peru tree (*Myroxylon Pereiræ*, Kl.) transmitted by Dr. Charles Dorat, reached England in February, 1861, and young plants raised from them in English hot-houses are now from nine to fifteen inches high. Some of these seeds were sent to the Botanic Garden of Peradenia in Ceylon, whence Mr. Thwaites thus wrote in November last respecting the plants obtained from them :—"The largest plant I have of *Myroxylon Pereiræ* has a trunk *nine inches* in circumference close to the ground, and the largest of several branches into which it divides at about a foot from the ground is 11½ feet long." In Jamaica and Trinidad, young plants derived from the same source have grown with great vigor. Those in the latter island are described by Mr. Prestoe, Director of the Botanic Garden (under date Dec. 8th, 1864) as "nearly five feet high : their aspect beautiful in the extreme. I do not remember to have seen foliage of a more glossy or darker green ; and they will doubtless be, ere long, magnificent trees. The rapidity of growth in such plants in this country is something truly wonderful."—*Lond. Pharm. Journal*, Feb. 1865.

#### THE SUGAR OF THE FUTURE.

TO THE EDITOR OF THE CHEMICAL NEWS.

SIR :—On page 299, vol. x., of your valuable paper appears, under the rubric of Continental Science, a single word about a

kind of sugar termed there, as the words used by my fellow-countryman and friend, Dr. J. E. de Vry, the sugar of the future. In reply to a note from me addressed to Dr. de Vry, I received the following letter, which I translate, and request you to insert it in your next impression, as it may contain some matter of interest to some of your readers.

DR. A. ADRIANI.

Dr. de Vry writes as follows:—"When, in the year 1857, I proceeded on my journey from Holland to Java, I stayed a month in Ceylon, and while there I became acquainted with the *Borassus flabelliformis*, vulgarly called by the Ceylonese-British inhabitants palm of Palmyra; and among other products of native industry my attention was called to the sugar sold by the natives under the name of *Jaggery*. The large number of the trees alluded to gave rise that, in conversation with parties in Ceylon, I uttered the idea of the possibility of applying the said palm trees, by regular cultivation, as a means of obtaining sugar on the large scale. As, however, my stay in Ceylon was only temporary, and as I, moreover, had neither time nor implements and apparatus for anything like a proper investigation, the matter was left at rest until, after having got settled in the interior of Java, my attention was aroused by the large quantity of sugar which is obtained by the Javanese inhabiting the Preanger Regentschappen from the Aren palm (*Arenga saccharifera*.) It is true that the late Professor Reinwardt\* had asserted that the juice of this kind of palm yielded a sweet material, but he had, as was perceived by me at once, erroneously stated that this was simply glucose; for I found that the sugar obtained by the natives in a very rude and primitive manner contains even yet then a large proportion of cane sugar." Dr. de Vry describes the mode of preparation of sugar from the Aren palm, as carried on by the Javanese, as follows:—"As soon as the palm commences blooming, a portion of the stem carrying the blossom is cut away; there exudes from the wound so made a juice containing sugar, which juice is collected in tubes made from bamboo-cane previously exposed to smoke, with

\* Dr. C. G. Reinwardt, late Professor of Botany and Chemistry of Leyden University, was, from 1816 to 1825 (nifallor,) in Java to organise the scientific researches there to be made by botanists, geologists, &c., &c.

the view of preventing the otherwise too rapidly proceeding fermentation of the juice under the joint influence of a warm climate, and the presence in the juice of a nitrogenous substance. The juice so obtained is immediately poured into shallow iron pans, heated by fire and inspissated by evaporation, until a drop of the liquid, exposed to cold by allowing it to fall on a cool surface, becomes solidified; if the desired degree of inspissation has been obtained, as evidenced by this experiment, the whole contents of the pan is cast into the shape of big cylindrical lozenges. Many thousands of pounds of sugar are annually obtained in this very primitive manner. I collected in a clean glass bottle a portion of the juice, and found that the unaltered juice does not contain any glucose at all, but it contains a nitrogenous principle which, aided by the warm climate, soon causes the conversion of a portion of the cane-sugar of the juice into glucose. In order to prove, without the aid of any very artificial means, that the juice of the Aren palm contains pure cane-sugar, I collected a portion of juice exuding from the tree, allowing it directly to flow into alcohol; by these means the nitrogenous principle alluded to is at once eliminated by coagulation. I thus obtained a mixture of equal parts of juice and alcohol; after filtration, this mixture was evaporated on a water-bath to the consistency of a syrup. This syrup I took along with me on my journey from Java home, and during the journey the concentrated syrup became solidified, exhibiting rare and beautifully well-defined crystals of cane-sugar, which, by every *connoisseur*, were immediately recognised. At the Congress at Giessen I have spoken about the manufacture of sugar from palm trees as the only rational mode of obtaining sugar in future, upon the following grounds:—Sugar, *per se*, consisting, as it does in a pure state, solely of carbon, hydrogen and oxygen, does not withdraw from the soil anything, but the plants now-a-days mainly cultivated for obtaining sugar therefrom—viz., the *Beta vulgaris* and *Canna indica*—want for their growth a large proportion of substances from the soil in which they are grown for their sustenance; hence their culture impoverishes the soil. This, however, is not the least evil, for what is worse is, that the space now occupied by beet-root in Europe, and by sugar-cane in the tropics, might and ought to serve for the growing of



corn or fodder crops in Europe, and for growing rice under the tropics; and it is my opinion that, owing to the steady increase of population both in Europe and Asia, the time may not be far distant that it will be imperatively necessary to apply the space of ground now devoted to beet-root and sugar-cane to the cultivation of corn-crops and rice, in order to supply the increasing demand for these staple articles of consumption. Whereas sugar-cane and beet-root require such soils as are also adapted for cerealia, the Aren palm flourishes in soils utterly unfit for that purpose, so unfit even that it would be in vain to attempt to render such soils fit for the growing of rice or cerealia; the Aren palm relishes the deep mountain ravines of Java, running, in some parts of the island, from the sea-shore so the interior, the said palm being found in groups together; and it is quite possible to lay out fine plantations of this beautiful tree. There is one drawback, though not a very serious one, viz., not before the trees have obtained an age of from ten to twelve years are they fit to yield sugar. When, however, it yields sugar, the tapping can be continued for many years, and the sugar manufacture will become a continuous—not as now, an interrupted—industry. According to my calculation, a field of 500 square Rynland† roods planted with these trees, would yield annually 40 picols‡ of sugar from a soil quite unfit for any other kind of agricultural service.

I am, &c.

Dr. J. E. DE VRY."

—*Chem. News.*, Feb. 3, 1865.

#### REVIVED CORKS.

The attention of the French public has been called, by M. Stanislaus Martin, to the employment of refuse corks as dangerous to public health. It is the custom of the Paris scavengers to collect those which are brought down by the sewers, and sell them to persons who make it their business to revive them. If the corks are of unsightly shape they are re-cut; while, if containing holes, these are filled up with mastic, and then smeared with a powder to give them a proper color. Such corks used only to be employed by the ink and blacking makers, but their low price (5s. 6d. per 1000) has of late induced retailers

† Equal to about three-quarters of an acre.

‡ One picol is equal to about 60 kilogrammes.



of bottled beverages to purchase them. M. Martin asks if there be not ground for alarm lest some of these corks may have been formerly used to stop bottles containing poisonous substances; for although a good cork is not permeable, a bad one, full of holes, may readily become the receptacle of particles of verdigris, carbonate of lead, arsenic, or an infinity of other poisonous substances, which may be more or less soluble in water, wine, beer, cider, vinegar, milk, or oil. The *Medical Times* express a hope that these revived corks may never give rise to juridical errors, causing the innocent to be declared guilty.—*Chem. News*, Nov. 26, 1864.

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## Editorial Department.

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PHARMACY IN THE ARMY.—Our readers will find three articles relating to this subject in this number. Notwithstanding some repetition we have preferred to publish both of those in reference to medical store keepers. The paper from Memphis had appended to it a valuable report on the actual amounts of medical stores distributed to the army of the south western States from the Memphis depot, but its publication has been deferred for the present. We are in anticipation of some reports from Hospital Stewards, relative to field service, and invite our friends in that service to communicate any facts of special interest. The well written article by Dr. Fell, in this number, gives an insight into the Pharmacy of a large Army Hospital, creditable to the executive management of the Medical Bureau. The most interesting part of this subject has reference to the purveying departments of New York and Philadelphia, including the statistics of the laboratories at Astoria and Philadelphia. The former has recently been destroyed by fire, and we do not know whether it will be rebuilt or not. At a proper time we hope to be able to publish reports on these, when we can do it with the approval of the Bureau at Washington.

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HOSPITAL STEWARDS. *The Caduceus* for Feb. 1st. A copy of this sheet, which is “devoted to the interests of the Hospital Stewards” of the United States Army, and published twice monthly at Washington, has been sent to us, containing an appeal to the Senators and Members of Congress in relation to the status of Hospital Stewards in the Army; and asking for the “increase of rank and pay of this class of Government employees to that of Brevet Second Lieutenants, to take rank after the graduates of West Point Military Academy.” The reasons offered for asking this boon are the following:

"1. The duties of a Hospital Steward surpass in arduousness of execution and intricacy of detail, those of any other non-commissioned officer in the service, compelling him to possess a thorough knowledge, not only of the Medical, but of the Commissary, Ordnance, and Quartermaster's Departments.

2. They exceed—we state this with the respect due the rank—the duties and responsibilities of the rank asked for, in any branch of the service.

3. They are required to possess a fair professional education—and to undergo a strict examination *previous* to their appointment—a qualification required only of commissioned officers, with this solitary exception.

4. The Army Regulations already partially recognize the fact of the injustice of classing them with enlisted men, by allowing their resignations to be favorably considered, and prohibiting their reduction to the ranks.

5. Clerks in the Quartermaster's, Ordnance and other Departments of the Army, getting double, treble, and even quadruple their pay, are required to possess no superior attainments, and none of the medical knowledge necessarily required of Hospital Stewards.

6. In the execution of their duties they are compelled to enforce obedience over two non-commissioned ranks above them, a fact contrary to the spirit of the Regulations.

7. When on detached duty at Departmental Head-Quarters, they receive no extra pay, although an order from the War Department directs that all enlisted men on such duty shall receive it; here they are again treated as commissioned officers and not as enlisted men.

8. They have no opportunity for promotion, and can seek in the approval of their superiors only, their reward for duty faithfully discharged."

The paper is published under the superintendence of a central committee of the Stewards at Washington.

THE ALUMNI ASSOCIATION OF THE PHILADELPHIA COLLEGE OF PHARMACY.—A number of the graduates of this Institution have formed an association under the above title, and propose to hold a general meeting in the present month (March,) with a view to its extension. The number of graduates is now so large that a fair prospect offers for a numerous membership, and with a proper *esprit de corps* the association will prove a useful agent in upholding the professional character of its members, and through them, of the Pharmaceutical body at large. In our next issue we hope to notice the results of the ensuing meeting, and will then give a statement of its organization.

SAINT LOUIS COLLEGE OF PHARMACY.—The following announcement of the reorganization of Pharmaceutists in St. Louis under the above title, with the prospect of opening a School of Pharmacy the ensuing winter, will be hailed with pleasure by all advocates of Pharmaceutical progress. The old "St. Louis Pharmaceutical Association" did not survive the shock of the upturning influences which marked the breaking out of the Rebellion, and never seemed to possess strong vitality. We trust that the new movement will be made under happier auspices, and that the St. Louis College

of Pharmacy will invigorate Western Pharmacy and become an important center of Pharmaceutical instruction and progress.

722 Broadway, St. Louis, January 31, 1865.

PROF. PROCTER,

*Dear Sir :*

I have the pleasure of announcing to you that a College of Pharmacy was founded in our City two months ago, under the name of the "Saint Louis College of Pharmacy."

I have been requested to forward to you, for publication in your excellent Journal, the names of the officers elected. The Board of Trustees have decided to defer the commencement of lectures until next November; the Professors of the College have not been elected yet. We have adopted the Constitution and By-Laws of the Philadelphia College. Knowing the interest you always manifest towards the progress of Pharmacy as a Science, we are sure you cordially extend towards us the right hand of fellowship, and wish us good success in our undertaking.

I am, dear sir, truly yours,

JAMES O'GALLAGHER, M. D.,

*Corresponding Secretary of Saint Louis College of Pharmacy.*

OFFICERS OF THE SAINT LOUIS COLLEGE OF PHARMACY.

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THE UNITED STATES DISPENSATORY. The twelfth edition of this great work, which has been in course of revision during several years past, is rapidly approaching completion. Its appearance has been delayed by the death of Dr. Bache, throwing the labor chiefly on Dr. Wood; but especially by the unusual mass of materials which seven years have evolved, including the many changes rendered necessary by the revision of the United States and British Pharmacopœias. With every endeavor to keep the size of the volume within its present limits, more than a hundred pages will be added to it, notwithstanding the great saving of space by the consolidation of the three British Pharmacopœias into one. There is every reason to believe that the work will be published between the middle and the end of March.

OUR SCHOOL OF PHARMACY.—About thirty students of the Class 1864—65 have passed the examination of the present term, out of a class of 106. The Annual Commencement will be held on Saturday evening, the 11th of March, at the Musical Fund Hall, on which occasion Prof. Parrish is expected to deliver the Valedictory Address.



"PHARMACY IN AMERICA" THROUGH ENGLISH SPECTACLES.—If our cotemporary of the *Pharmaceutical Journal* admitted into its columns the article headed "Pharmacy in America," in that *Journal* for December, believing it to convey a truthful impression of the state of pharmacy here, it may satisfactorily account for an obliquity of vision which prevents him from seeing any merit in numerous papers that have originally appeared in this country. As a pharmaceutical journal should aim to give a record of the progress of science irrespective of its origin, and especially of that developed in its own language; we believe the *Pharmaceutical Journal*, as almost the sole exponent of the science of Pharmacy in Great Britain, would give a better view of "Pharmacy in America," and serve the cause of science, by publishing such papers as that of Wenzell, on Ergot, in this *Journal* for May, 1864, and several others, which have reached European readers through a German translation.

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*Proceedings of the American Pharmaceutical Association at its Twelfth Annual Meeting; held in Cincinnati, Ohio, September, 1864; also the revised Constitution and Roll of Members.* Philad., pp. 335, octavo.

We acknowledge with pleasure the receipt of this Annual, which made its appearance about the 18th of February, after more delay than usual, arising from causes, explained by Prof. Maisch in the prefatory note relating chiefly to the transmission of proof sheets, and the execution of the illustrations. We have already, in November last, printed the minutes, and have given therein a list of the papers read at the meeting, and which constitute the volume before us.

Of the Reports, that on the Progress of Pharmacy, by George J. Scatertgood occupies one hundred and thirty pages, and is arranged on the plan followed for several years past, initiated in 1862, by Prof. Maisch, classifying the subjects under various heads and sub-heads.

The continuation of these Reports, if nothing else was included, will warrant the publication of an annual volume. The report on the Drug Market by Prof. Maisch next follows, occupying twenty pages, including an appendix by J. J. Thomsen of Baltimore. This report though necessarily made under disadvantageous circumstances, conveys much information, and encourages the view that hereafter the labor of this committee may become very useful.

There are twenty special reports and seven volunteer essays, which together are more numerous than on any previous year, and though none of them of great length, are creditable productions, and worth the attention of members not present at the meeting.

The paper on "The Pharmaceutist as a Merchant," by Frederick Stearns, commends itself to the attention of every young pharmacist, as full of sound and healthy advice on the conduction of our business. Prof. Mayer, in his paper on Tobacco, arrives by experiment at the conclusion "that Nicotina is the active principle of all parts of the plant before and after curing," and that recent tobacco contains no ammonia or



trimethylina. Mr. Gordon's paper on glycerin and its applications possesses considerable interest, especially in reference to its use as a menstruum in extracting spices, etc. One of the best papers is that by Dr. Stabler on a hydraulic press adapted to the purposes of pharmacy, which is illustrated with two lithographs, that render its internal construction, though complex, easily understood. It stands on a base 18 inches square, and has a power of 10 tons pressure.

The question of the botanical source of "Southern prickly Ash" has been definitely settled by the paper of Dr. Bridges, from specimens sent from Beaufort, South Carolina.

Among the volunteer essays, the most extended is that of Prof. Parrish, on "a systematic course of study and manipulation for students of Pharmacy." The papers of Prof. Maisch on the assay of French Brandy, Sherry Wine and Whisky as conducted at the army laboratory, offer many valuable suggestions. The paper on Oleum Ethereum by C. Lewis Deihl, Jr., is particularly deserving of notice. This, and several of the papers mentioned, will be found in this number. We have not had leisure to examine the book closely, but we have the statement of Prof. Maisch that great care has been taken to avoid errors of the press. The cost of the volume has been about 33 per cent. more than that of 1863, a difference due to the cost of material and labor, and to the more expensive illustrations in this volume. We hope the committee will succeed in getting it distributed as early as practicable.

The address of Prof. Maisch, Editor, and Chairman of the Executive Committee, is U. S. Army Laboratory, Sixth and Oxford Sts., Philad., Pa.

As it is now the duty of the Executive Committee to withhold this volume from all members who are four years in arrears, it is to be hoped that such delinquents will forward their dues to the Treasurer, J. Brown Baxley, Baltimore, and have the Proceedings sent to them. The much greater cost of this volume than usual renders such action on the part of all members in arrears very desirable.

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*Medical Lexicon. A Dictionary of Medical Science*; containing a concise explanation of the various subjects and terms of Anatomy, Physiology, Pathology, Hygiene, Therapeutics, Pharmacology, Pharmacy, Surgery, Obstetrics, Medical Jurisprudence and Dentistry: notices of climate and of mineral waters, formulæ for officinal, empyrical and dietetic preparations, with the accentuation and etymology of the terms; and the French and other synonymes, so as to constitute a French as well as English medical lexicon. By ROBLEY DUNGLISON, M. D., LL. D., &c. Thoroughly revised and very greatly modified and augmented. Phila.: Blanchard & Lea, 1865; pp. 1047 octavo, closely printed.

Our readers will be gratified to learn that this new edition has been published. It reached us too late for notice in this number.

THE  
AMERICAN JOURNAL OF PHARMACY.

MAY, 1865.

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ON CAPSICUM ANNUUM.

BY DAVID PRESTON.

(An Inaugural Essay, presented to the Philada. College of Pharmacy, 1865.)

Capsicum has been the subject of many experiments, with a view to determine what principle gives activity to the fruit, and whether it is due to a crystallizable substance, alkaline or neutral, or to a resin, and various opinions have been given in regard to it.

Soon after the discovery of alkaloids in the vegetable kingdom, it was stated that this fruit contained one, as will be seen by the following, extracted from M. Oersted's paper in vol. vi., *Journal de Pharmacie*, for 1820, page 372.

"One of my friends," says M. Oersted, "has also found a new alkali of great acrimony in the fruit of *Capsicum annuum*. This alkali is but slightly soluble in water and possesses greater capacity of saturation than the alkalies of the same class. It forms with protoxide of lead and muriatic acid a triple salt which preserves all the acrimony of the vegetable alkali."

A few years previous to this statement, (1816,) the fruit was analyzed by Bucholz and Maurach, and the following year by Braconnot.

Bucholz acted upon the fruit with alcohol, evaporated the alcoholic solution to an extract, treated this with ether, and allowed the ether to evaporate; the result he called a "soft acrid resin," or capsinin. Braconnot obtained the same, and called it an "acrid oil."

Prof. Procter, a few years since, made an investigation of the

subject, and found, by adding to an alcoholic solution of the oleoresin a solution of subacetate of lead, a copious precipitate was thrown down, which, when thoroughly washed with alcohol, possessed none of the acrimony of the plant. But that the matter remaining after evaporating the filtered liquid was much more pungent than before.

Mr. Horace B. Taylor, a graduate of the Philadelphia College of Pharmacy, took up the subject for his inaugural essay, which was published in the fourth number of the American Journal of Pharmacy, for 1857. In the course of his experiments he obtained a crystallizable principle, which he supposed to be the true capsinin and active principle of the plant.

As the process adopted by Mr. Taylor was followed by myself for the first experiment, it will not be out of place to mention it here.

The capsicum was exhausted by means of ether,—the ethereal solution allowed to evaporate spontaneously. The resulting oleoresin was dissolved in alcohol, precipitated by solution of subacetate of lead, filtered, a current of sulphuretted hydrogen passed through the filtrate to free it of lead, the solution again filtered and heated to the boiling point to drive off the sulphuretted hydrogen.

This solution was allowed to evaporate spontaneously. When the alcohol had all passed off, it shot out in beautiful crystals, without a mother-liquid.

He states that they were obtained on the coldest day of that winter, and supposed, from other experiments that were made, that it was due to the low temperature, that the crystals were formed. They possessed the acrimony of the plant.

Mr. Heydenrich next considered the subject, (published in the Third Series, vol. vi., American Journal of Pharmacy,) repeating Mr. Taylor's experiments, but could not obtain the crystals. Other experiments were tried by this gentleman to procure, if possible, a crystalline principle, but failed to obtain them.

He concluded that the activity of the fruit was due to two fixed oils, differing from each other in fluidity and color, and that the oil of Prof. Procter contains them both.

1st. In commencing my researches, 4000 grains of capsicum



were packed in a glass percolator, and Ojss. of stronger ether passed through it. This was evaporated, and yielded 778 grains of oleo-resin. Of this, 200 grains were dissolved in fʒiii. of alcohol, sp. gr. .835, and treated in the manner above mentioned by Taylor. After going through the precipitating process, &c., the solution was set aside for spontaneous evaporation, and, as the alcohol evaporated, a separation took place, resulting in two liquids. One light-colored and viscid, while the other was a dark reddish-brown oil, with a low sp. gr., and floated on the surface of the other in small globules. When the viscid liquid was reduced by evaporation, it was placed in a freezing mixture, when it immediately assumed the crystalline form,—resembling in every respect the description of those obtained by Mr. Taylor, possessing much acrimony, accompanied with a peculiar astringent, leady taste. They were treated for lead by iodide of potassium, with the result of a copious amount of iodide of lead.

It was impossible to free the crystals of the pungency of capsicum; and, to satisfy myself that crystallization was due to the lead salt, the experiment was repeated, taking care, in this case, to entirely free it from lead, by the sulphuretted hydrogen, (which I knew by testing from time to time in the process.) The result was the reddish-colored oil of Prof. Procter—and no crystals.

2d. This oil was dissolved in alcohol, sp. gr. .835, and passed through animal charcoal, which freed the solution entirely of color. The alcohol was evaporated at a temperature of about  $140^{\circ}$ , and left an oily liquid, almost colorless at first, but which gradually acquired color by age, until of a dark red tint. It is neutral to test-paper; has an exceedingly acrid, burning taste, which remains for a long time. Concentrated sulphuric acid chars it, and destroys its pungency entirely.

Nitric acid has a peculiar action upon the oil, depriving it of acrimony, without producing any marked effect on the oil itself, which I think proves that the pungency is not due to the fixed oil, but to a principle dissolved in it, the nature of which is yet undetermined. The yield of this oil from capsicum is so small, that I had not enough to make the investigations to decide whether this principle could be separated from it, and to demon-



strate that the pungency really is not due to the oil, of which I have expressed my doubts.

This oil unites with alkalies and alkaline carbonates to form soap, and is lighter than water.

3d. A small quantity of it was placed in a retort, connected with a receiver, (kept cold by snow,) and heat gradually applied until fumes commenced to arise, when it was removed until they subsided, and then again applied. The vapors continued to arise and pass over without being condensed.

More heat was brought to bear, until it commenced to blacken and an empyreumatic odor was given off. The retort was disconnected, and the remaining black oil, on examination, was found to be destitute of pungency, but had an acid, empyreumatic taste, giving a decided acid reaction with litmus paper. The receiver was again connected, and the oil subjected to a high degree of temperature, when acrolein distilled over, proving the presence of glycerin and the fact of its being a fixed oil. This experiment proved, also, that the acrid fumes (so well known when capsicum is heated) cannot be obtained by distillation, as they cannot be condensed at the ordinary pressure of the atmosphere.

4th. The dregs from the ethereal menstruum were dried, again packed in a percolator, and treated with alcohol, sp. gr. .835, until no longer possessed of color or taste.

This was evaporated to a soft extract, and found to weigh 295 grains, which had the pungent taste of the drug to a marked extent. When treated with ether, this quality was extracted almost entirely, leaving a dark-brown extractive, slightly soluble in water and chloroform, quite soluble in alcohol, but insoluble in ether and benzine. Saponifiable with soda and potassa, and precipitated from its solution by solution of subacetate of lead.

5th. A fresh quantity of capsicum was treated with benzine, (which proved to be an excellent solvent,) the benzine allowed to evaporate spontaneously. When nearly all had passed off, and the liquid became of a syrupy consistence, a crystalline substance began to deposit, of a dark reddish-brown color, surrounded by a mother-liquid of the same color. This was at first thought to be the true capsicin, obtained without any chemical

reagents. The crystals were possessed (in the crude state) of all the fire of capsicum, and well calculated in every respect to deceive. To purify them they were dissolved in alcohol, and the alcoholic solution passed through animal charcoal, which deprived the solution of color; this was carefully evaporated, and resulted in a beautifully white, crystalline fat, with but little odor and a mild, not unpleasant, taste, being entirely freed of the characteristic taste of the plant by the action of the charcoal.

6th. The mother-liquid was next dissolved in benzine and passed through animal charcoal, which deprived it of the red coloring matter, but did not free it entirely of the fat, which could not all be separated before making the solution. By subjecting this to a low degree of temperature, the fat would crystallize, and in this way, by repeated coolings and separation of the fat after each time, the latter was gotten rid of. The remaining oil was of a light amber color, and possessed great acrimony. This differed from the oil in the second experiment in two respects: first, that the color of this oil remains the same while exposed to the air; and, second, that it was more viscid than the other, and became almost solid when subjected to a freezing mixture.

7th. A small quantity of capsicum, in powder, was subjected to distillation; the distillate was very slightly pungent, and had a disagreeable odor. This experiment proves that it contains little or no volatile oil.

*Summary.*—From my experiments, I have drawn the conclusion that the activity of the plant is not due to an alkaloid, but to a fixed oil, either as a fixed oil, or to a principle dissolved in the oil, which may be volatile, but for isolating which, there has not yet been found a process.

I am strongly inclined to believe the latter is true; and will suggest that it may be decided by procuring a larger quantity of the fixed oil and washing it with repeated small portions of alcohol, diluted, so as not to dissolve the fixed oil, and then separating the pungent principle from this liquid by evaporation and washing with ether; or, by the action of good animal charcoal, as in the process of M. Lebourdais.



## AN AUTOMATIC PHARMACEUTICAL STILL.

By A. F. W. NEYNABER.

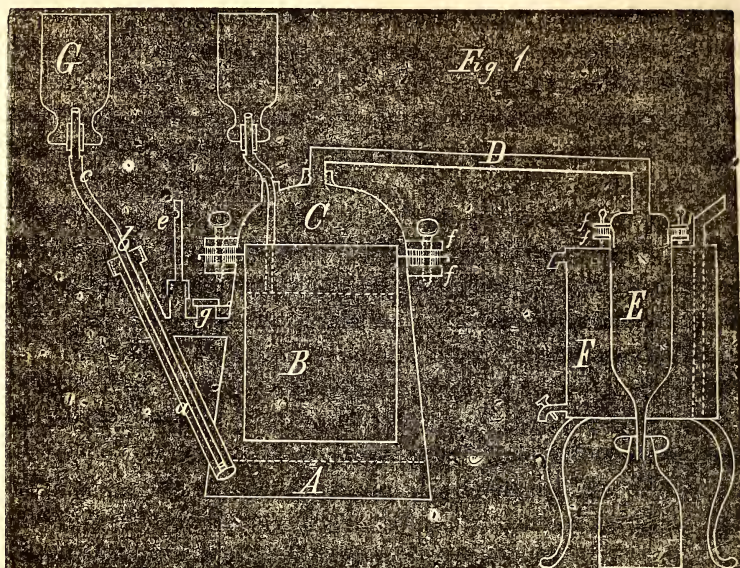


Fig. 1. A, Shows the outer boiler.

B, " " inner boiler.

C, " " dome.

D, " " steam conducting pipe.

E, " " condenser.

F, " " refrigerator.

The outer boiler A is connected by means of the pipe *a*, *b*, and *c* with the feeder G, consisting of a suitable bottle of about one gallon capacity. The pipe *b* is so arranged that the water in the outer boiler will be at *d*. As soon as the surface of the water in A falls below the extremity of the pipe *b*, air entering through *e* will pass through the pipe *b* into the bottle G, and a corresponding portion of water will descend into the boiler A, and so a continuous supply of water will be kept up in the boiler A until the bottle G is empty. *f, f* are cast-iron rings, which, by means of screws, press the rims of A and B, and the dome C, having rings of India-rubber between them, together, so as to form a steam-tight joint. As soon as the generation of

steam in the water boiler will be more than necessary, the superfluous steam escapes through the valve *g*.

In case the bottle *G* should become empty, an alarm pipe, attached to *e*, will give the alarm as soon as the water falls below the extremity of the pipe *a*.

The inner boiler *B*, made of a suitable size, can be fed, if desired, in the same manner as the outer boiler. On the top of the inner boiler fits also a porcelain evaporating dish, for those cases where the liquid would corrode the boiler. The conducting pipe *D* is connected with the dome *C* and the condenser *E* by means of cast-iron and India-rubber rings and screws, so as to make perfect steam-tight connections.

Without the inner boiler *B*, the apparatus will be sufficient for making *aquæ distillatæ*, and a perforated diaphragm put near the surface of the water will make the apparatus suitable for distilling medicated waters or essential oils from flowers or herbs.

On this apparatus, after detaching the conducting pipe *D*, the condenser can be easily cleaned and deprived of the odor of different substances, so that the objection raised against the condensing worm is removed.

Without the dome *C*, etc., the inner boiler *B* (screwed tight to the outer boiler *A*) will be suitable for boiling syrups, etc., also for evaporating, for which purpose a separate dome may be substituted to carry off the steam to a flue. In this case, the dome *C* should not fit tight, but be slightly raised, so as to leave a space not quite so large as the space in the pipe *D*, so as to bring on a draught when the pipe *D* is connected with a chimney flue, by which the generated steam will be rapidly carried off, and so the evaporation greatly favored.

As plainly seen, the quantity of liquid in the apparatus is very small at the time, and, consequently, very little heat is required to bring on distillation, yet the evaporated liquid is instantaneously replaced, and so a continuous distillation kept up; consequently the saving of fuel will be considerable, and this will make the apparatus, together with the safety from scorching, the most suitable one for stoves in drug or apothecary stores, or for gas furnaces.



## THE ST. REGIS SULPHUR WATER OF MASSENA, ST. LAWRENCE CO., N. Y.

BY FERDINAND F. MAYER.

"The springs are on the verge of the Raquette River, a broad and rapid stream, about a mile from Massena village, which is situated on the Grass River. These two streams, of about equal volume, run almost parallel for many miles, and empty into the St. Lawrence opposite Cornwall Island. The St. Lawrence is only four miles distant from the springs, in a straight line, and the nearest station, on the Great Northern Road from Ogdensburg to Rouse's Point, is at Potsdam, fifteen miles distant. As early as the close of the last century these waters were discovered by surveyors, and they saw the oozy ground around them filled with the hoof-prints of the moose and deer, who visited there on account of the saline qualities of the fountains. The Indians had used them as remedies for ulcerations, it is said, as long as tradition can reach back; and as early as 1815, white people occasionally sought relief from cutaneous diseases by their use. The first settler there was Captain John Polly, a soldier in the second war for Independence, and there he was yet residing at the time of Portfolio's visit. They had a long and pleasant interview, and the captain gave our friend a graphic history of his adventures. In 1822, when Polly was in the vigor of manhood, he purchased forty acres there, on which are the fountains and the present growing village of Massena Springs; and there he erected the first accommodations for visitors. At about that time a young girl greatly afflicted with salt-rheum came, and was completely healed. A few years later, the Canadian Roman Catholic Bishop, Alexander M'Donald, came there with the "black scrofula," which he had contracted in Egypt. His legs were covered with black ulcers to his knees. He remained a month and was entirely cured. Since then, hundreds afflicted with every description of cutaneous disease, chronic dyspepsia, and diarrhœa, and kindred complaints, have there found relief or positive cures. Such is the general testimony.

"There are two springs, only a few feet apart, one warm and the other cold. The latter is enclosed and surrounded by a spacious covered platform. The other is also enclosed, but is so little used that its surroundings are about as primitive as when the moose and the deer resorted there; of late it has been built over by the embankment of a bridge. Professor Emmons has given the following result of an analysis of the two springs:

	Warm Spring.	Cold Spring.
Chloride of sodium . . . . .	6.988	6.205
Magnesia . . . . .	.644	.846
Calcium . . . . .	1.026	.446
Sulphate of lime . . . . .	2.794	1.960
Carbonate of lime . . . . .	1.630	1.100
Hydrosulphuret of magnesia and organic matter,		1.870
	<hr/> 13.082	<hr/> 12.447

"In 1828 the present Harrowgate House was erected on the top of the slope, about forty rods from the river, where the springs were first curbed. In 1848 the spacious brick edifice opposite the Harrowgate House, known as the United States Hotel, was erected by Benjamin Phillips, and both are owned by him. All about has a new appearance. The little village of a dozen houses has grown up within a few years; a bath-house has been erected, and shade trees have been planted. Other and extensive improvements are in contemplation, and soon the Massena Springs will become a delightful summer resort for the healthy as well as the sick."—*Harper's New Monthly*, June, 1856.

The water, as sold in bottles, is stated to contain less of the gas than is the case at the spring, where it presents more of a sparkling appearance. It is at first perfectly clear, and of not unpleasant taste, aside of the sulphurous. Like other similar waters, it becomes turbid when exposed for some time to the air, a portion of the sulphur being precipitated; but this again disappears by the continued oxydising action of the air, and the odor itself is finally lost.

To mix or impregnate the water with carbonic acid is not practicable, since it decomposes the sulphuret in solution, and renders the water opaque. The bottles contain about one quart of water. Its specific gravity at 60° F., taken in a 12½ oz. flask, was found to be = 1.0317.

*Course of Quantitative Analysis.*—Ten litres were evaporated on the sand bath in a Berlin porcelain dish. The residue, dried at 212° F., weighed 38.14803 grammes; dried at 350° F., after treatment with sulphuric acid, (calculated from a portion,) it weighed 33.79 grammes.

Three litres were acidulated with hydrochloric acid, and evaporated in a porcelain dish to dryness. The residue was moistened with hydrochloric acid, evaporated to dryness in an air bath until no more acid vapors were given off; the mass was then treated with water, decanted repeatedly, and the precipitated silica and organic matter separated by a filter from the solution of the salts.

In the latter the iron, phosphoric acid, lime, and magnesia, were determined in the usual manner. In the first (ammonia) precipitate the metal was found separately by volumetric assay.

The alkalies were determined by boiling down one litre with milk of lime, filtering, precipitating the lime in solution by car-

bonate and oxalate of ammonia, then evaporating the filtrate with a small excess of hydrochloric acid, igniting the residue to drive off ammoniacal salts, redissolving in water, precipitating remaining traces of earths with carbonate of ammonia, filtering, evaporating to dryness, and igniting. The residue were the chlorides of the alkalies. The potassa was only separated by a large excess of chloride of platinum. In the mixed chlorides the amount of each was determined by the indirect method, with a volumetric solution of silver.

500 cubic centimetres of the water were drawn off by a syphon, and precipitated by an excess of Tenth normal solution of silver, which carried down chlorine, bromine, carbonic acid, sulphur from sulphurets, and on heating also that of hyposulphurous acid, half of the sulphur from the latter forming sulphuric acid. The excess of silver was removed by Tenth normal solution of chloride of sodium, and the excess of the latter determined by the corresponding solution of silver with the aid of chromate of potassa.

The silver precipitate treated with ammonia was separated into soluble chloride and carbonate, and insoluble sulphuret of silver.

To determine the combined amounts of sulphurets and hyposulphite, several quantities of 500 cc. were measured with a dilute solution of iodide of starch. Neither the silver nor this test can be used to determine them separately. For, one equivalent of iodine, while it substitutes one eq. of sulphur in a sulphide or sulphuretted hydrogen, oxydises four eq. of sulphur in hyposulphurous acid to one eq. of pentathionic acid. On heating a solution of a hyposulphite with nitrate of silver, half of the sulphur only is carried down as sulphuret of silver, the other half being oxydised to sulphuric acid.

Another portion of the water was precipitated with a neutral solution of chloride of cadmium, and the filtrate measured with the solution of iodide of starch. This last amount, corresponding to hyposulphurous acid, deducted from that found for the water previous to the treatment with cadmium, leaves the amount of iodine corresponding to sulphurets.

A portion of the hot solution from which silver had precipitated chlorine and sulphur, was acidulated with hydrochloric acid, and precipitated with chloride of barium. The sulphate of baryta



obtained, less that corresponding to one-half of the hyposulphurous acid, gave the amount of sulphuric acid.

To a graduated flask containing 850 cc. of the water, was added a solution of chloride of barium and ammonia; the mixture, after being allowed to settle, was carefully decanted, the precipitate twice washed by decantation, then treated with hydrochloric, and afterwards with sulphuric acid, and the sulphate of baryta collected and weighed. This gave the baryta corresponding to the sulphuric acid *plus* carbonic acid. *The whole of the hyposulphite and sulphurets remained in solution.*

Through a measured flask of the water a current of washed hydrogen gas was conducted as long as any sulphuretted gas was being carried off. The water was then measured with iodide of starch solution; the loss, as compared with the fresh water, gave the quantity of free sulphuretted hydrogen.

Another quantity of the water was mixed with a neutral solution of sulphate of manganese, and then treated with hydrogen. The gases, as evolved, were passed through an ammoniacal solution of nitrate of silver. The resulting sulphuret of silver represented free sulphuretted hydrogen plus the acid in the hydrosulphate of the sulphuret (of sodium); and the quantity of this half-combined sulphuretted hydrogen was found by deducting the amount of free sulphuretted hydrogen lost in the first treatment with hydrogen from that found in the second; and the amount of alkaline sulphuret by deducting the latter amount from the sulphur precipitated as sulphuret of cadmium.

The bromine was determined by extracting a portion of the original residue obtained by evaporating ten litres, with alcohol, and comparing in the residue from the evaporation of the alcohol the coloration of chloroform by chlorine water, first with a solution of chloride of sodium, and then with a weak solution of bromide of potassium of known strength. No iodine was present, nor were any rare metals noticeable.

In reference to the presence of hyposulphites, I should say that in several of the analyses of the Virginia Springs certain bodies and reactions are mentioned and referred at a venture to organic sulphur compounds which may as well be explained by the presence of this same acid.



One thousand parts of the St. Regis water contain—

Oxyd of Calcium, = 0.46280

viz. 0.43045 as  $\text{CaO SO}_3$ .

0.03235 as  $\text{CaO 2CO}_2$ .

Sulphuric acid = 0.64846

viz. 0.03382 as  $\text{NaO SO}_3$ .

0.61464 as  $\text{CaO SO}_3$ .

Carbonic acid = 0.05535

viz. 0.05084 as  $\text{CaO 2CO}_2$ .

0.00451 as  $\text{FeO 2CO}_2$ .

Magnesium = 0.13123

viz. 0.12973 as  $\text{Mg Cl}$ .

0.00150 as  $\text{Mg Br}$ .

Sodium = 0.69767

viz. 0.53809 as  $\text{Na Cl}$ .

0.08949 as  $\text{NaO 2SiO}_2$ .

0.00964 as  $2\text{NaO PO}_5$ .

0.01945 as  $\text{NaO SO}_3$ .

0.04090 as  $\text{NaO S}_2\text{O}_2 + \text{NaS}$ .

Silicic acid (+ org. imp.)

0.07100

Phosphoric acid 0.01333

Ferrous oxyd 0.00387

Potassium 0.00457

Sulphur 0.07476

viz. 0.0288 as  $\text{S}_2 \text{O}_2$ .

0.0173 as free HS.

0.0146 as half-combined HS.

0.0140 as NaS.

Bromine 0.01005

Chlorine 1.21725

viz. 0.82976 as  $\text{NaCl}$ .

0.38745 as  $\text{MgCl}$ .

0.00414 as  $\text{KCl}$ .

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3.39034

Residual sulphates 3.379.

These constituents may be arranged in the following manner:

*A—in one Litre.**B—in one Gallon.*

	(A.)		(B.)
Chloride of Sodium,	1.36795	Grammes,	79.692 Grains.
Chloride of Potassium,	0.00871	“	0.508 “
Chloride of Magnesium,	0.51308	“	29.927 “
Bromide of Magnesium,	0.01155	“	0.673 “
Bicarbonate of Lime,	0.08319	“	4.852 “
Bicarbonate of Iron,	0.00838	“	0.488 “
Sulphate of Lime,	1.04116	“	60.931 “
Sulphate of Soda,	0.06003	“	3.501 “
Phosphate of Soda,	0.02263	“	1.320 “
Hyposulphite of Soda,	0.07210	“	4.205 “
Sulphuret of Sodium,	0.02410	“	1.405 “
Silicate of Soda, and organic compounds, }	0.19160	“	11.176 “

3.40448

198.678

Sulphuretted } *a* free, 0.0155 Grammes, }  
 Hydrogen. } *b* half combined, 0.0175 “ } 22.373, c. c.  
 Per Gallon, 5.307 Cubic Inches.

## PHARMACEUTICAL NOTES.

BY FERDINAND F. MAYER.

*Calabar Bean—Its Alkaloid.*—Some sixty beans were kindly contributed by Prof. Torrey towards the preparation of the alkaloid. A preliminary examination proved that the base, as well as its salts, were colorless, and whenever they became colored, a loss was sustained. To avoid evaporation as much as possible, I adopted the following method: The beans were reduced to moderately fine powder, and repeatedly digested with 85 per cent. alcohol, and then displaced with alcohol of the same strength. The tincture was subjected to distillation, while the residual powder was boiled with dilute sulphuric acid until all of the starch had disappeared. The residual extract from the tincture and the acid solution were then mixed, filtered and precipitated with iodohydrargyrate, the precipitate washed by decantation, transferred to a flask with good stopper, in which it was treated with a strong solution of protochloride of tin in tar-

trate and bicarbonate of soda, and then with ether. The colorless ethereal solution was distilled, the soft residue redissolved in dilute sulphuric acid, and again treated with ether and ammonia. The alkaloid was now obtained as an almost colorless mass, readily combining to form crystalline salts, but without any distinctive reactions. On dissolving the impure alkaloid in acids, a reddish-brown substance separates, which, from the experiments made with it, may be assumed to be inert.

The following are experiments made last winter by Dr. Haigh, of Michigan, for the prize essay at the College of Physicians and Surgeons, and which have not been published. The form in which the alkaloid, prepared as above, was used, is the hydrochlorate; the other preparations were made by Mr. Haigh:

"From the perusal of Dr. Christison's account\* I was led to believe I had a very energetic poison to deal with, and that in my experiments it would be necessary to exercise the greatest care in order to get its maximum effect without producing death. I therefore commenced experimenting with small doses, and as about 12 grains had produced such positive effect upon Dr. Christison, I commenced with 5 grains of the bean. This quantity, in five powders, was given, on a piece of meat, to a dog which weighed 17 lbs.

The animal was closely observed for two hours, but I could detect no symptoms indicating any action of the poison. The dog was then well fed for two days, in order that all influence, if any there had been, might pass off, and then a second dose of 10 grains was administered in meat as before. This, as in the first experiment, produced no effect whatever. Referring to the article, by Thos. Nunnally, in the London Lancet, I found that he had obtained well-marked poisonous effects upon a dog in 40 minutes from a dose of 12 grains of the bean. The symptoms he observed were: it was weak and had a desire to lie down, but would appear frightened if told to do so. The pupils were a little contracted, an effect said to be characteristic of this poison. Thinking there might have been some mistake in my experiments, I let the dog rest one day without food, and then gave him 15 grains of the powdered bean with meat. This time it produced some decided physiological effects. In 20 minutes after the animal had taken the powder there was a manifest drooping of the ears and tail, and he walked about as if very tired. In 30 minutes there was a little staggering in his gait, and a wandering about as if the air of the room was oppressive. When spoken to he would brighten up, but appeared immediately to forget it. No contraction of the pupils occurred. In about two hours he went to sleep, and was the next morn-

\* See Pharm. Journal, xiv. p. 470.



ing as bright as ever. I next tried a much smaller dog (a black and tan terrier weighing a little over 11 pounds) who had been fed on meat only for about a week. To this dog 15 grains of powdered bean was given, and as the animal was so much smaller than the former one I expected to see a more decided action than before; to my great surprise the dose did not seem to disturb him in the least. There was no contraction of pupils, nor any action whatever that I could ascribe to the bean. Finding Nunnely had obtained the most marked results from 35 grains given to a small dog, I gave this little dog a similar quantity (35 grains) the next day. To my great surprise from this also I got no effect. Expecting that so large a quantity of the poison would manifest itself in some manner, I watched the animal closely for two hours, but no effects were visible, unless it might be sleepiness; he slept quite soundly during the afternoon, which is rather unusual for a little terrier dog.

My experiments with the bean itself thus far seeming to contradict one another, and to produce no very marked results, I concluded to try to get the active principle in a more concentrated form. Accordingly four beans from my now limited stock were reduced to powder, and exhausted by treating with successive portions of boiling alcohol, and the tincture thus obtained evaporated to dryness. The result was a dark brownish mass of a resinous character, which weighed a little over 2 grains. This mass was divided into two equal portions, one of which was administered to the little dog, upon which the dose of 35 grains of the bean had produced no poisonous effects a few days before.

For the first 20 minutes nothing unusual was noticed, but at the end of that time he began to show a little uneasiness, which was manifested by drawing himself backwards. In 30 minutes there was manifest disturbance, and at 32 minutes after taking the dose there was a copious evacuation of the intestines. In 35 minutes there was another large, watery stool, accompanied by great tenesmus, with abortive attempts at vomiting. His walk, at the end of 40 minutes, became staggering, and his movements uncertain. He did not seem weak, but lacked the power of associating muscular action. He would follow me in an uncertain course as if intoxicated; his ears were drawn back, and he evidently felt a great degree of uneasiness. Drinking some water seemed to allay his nausea, but produced salivation. These symptoms continued to increase for three hours, accompanied by efforts to discharge fecal matter, when the tenesmus seemed to abate while the other symptoms increased. At three hours and ten minutes after taking the poison he could not stand still, but his body moved from side to side. The pupils were very sensitive; when exposed to a strong light from the window they would alternately contract and dilate, contracting to not more than a line in diameter, and then suddenly dilating to their fullest extent, would remain so for an instant and then gradually contract again, the contraction being much slower than the dilatation. Soon after the intestinal disturbance had



abated to some extent, the flexor muscles were thrown into a state of tonic contraction, the back was arched upwards and the tail drawn tightly down and close under his belly. The hind legs were thrown forward, while the fore legs were set backward, so that the points of support were changed, the hind feet being in front of the fore feet. His head was flexed on his neck in such a manner as to direct the eyes downwards. This posture was maintained so long as he remained quiet, half sitting and half leaning against the wall, the only position in which he seemed at all comfortable.

When he would start to go across the room, for he never was quiet but for a moment, he would, as if by a strong effort, draw up his head and straighten out his legs and start off in a quite lively manner, but before he would proceed far the muscles would again contract, his head be drawn, and he would bring up against the side of the room, a table leg or other obstacle with force enough to throw him down. After resting a moment he would make another attempt, but with no better success. He did not seem inclined to lie down, indeed he acted as if unable to do so. He would sometimes sit down, not in the usual manner, but with his hind legs projecting out in front of his face and his weight resting on the lower portion of his back.

These effects continued until 5 hours and 45 minutes after taking the poison, when he laid down and seemed disposed to sleep, whether from exhaustion or the effects of the dose I cannot say.

During all this time there was not a whine or a groan to indicate that he suffered pain, and the breathing appeared to be perfectly natural.

I left him, trusting that he would sleep and that I should find him much better in the morning, but he died during the night. Autopsy, 12 hours after taking the poison, showed no lesion whatever. The brain, lungs, stomach, intestines and mucous surfaces appeared in a perfectly normal condition.

I next tried the alcoholic extract upon a full grown young rabbit, placing 1-16th of a grain of it under the skin. In 10 minutes there was an evacuation of the bowels, also twitching of the muscles of the face, and a kind of munching motion of the lips. In 15 minutes there was a general tremor of the whole body, as if it felt cold. In 20 minutes it manifested great prostration, and could not stand quietly, but would squat down, as if dizzy, when it attempted to move. At the end of 25 minutes the heart beat very rapidly and irregularly, the breathing was very quick, being about 80 times in a minute, while lying flat upon the table. In 30 minutes the contents of the bladder was evacuated, and efforts were made as if to vomit. The eyes remained wide open, and the ears pointing forward. He twice made a peeping noise as if in pain, and got up and staggered across the table. When 35 minutes had elapsed after the exhibition of the dose, the animal seemed to improve; the breathing was less frequent and he could sit up. The action of the heart and lungs

became gradually slower and more regular, and after a general shiver of the whole frame, it, at the end of 70 minutes, seemed inclined to sleep. All the following day the animal was in a sleepy condition, but on the day following it ate freely and seemed well. A similar experiment was tried with a pigeon, one-twentieth of a grain of the extract was placed under the skin of the bird. Its effects were manifest in 2 minutes by a snapping of the bill and a rapid opening and closing of the eyes, as if striving to clear them of dust, and a shaking of the wings and whole body. In 5 minutes the muscles of the legs were paralyzed, and very rapid breathing, which did not seem to fill the lungs. In 8 minutes the wings and neck were paralyzed, and at the end of 10 minutes the bird was dead. Opening the body at once, I found the heart still beating and the lungs filled with air. Dr. Christison attributes death from the poison mainly to paralysis of the heart, but from this experiment it would appear that death was the result of a paralysis of the whole muscular system, involving the respiratory muscles, and that the heart ceased to beat only when venous blood began to circulate in the left side of the organ. In order to test the more direct action of the poison upon the heart, I determined to inject it into the vein of a dog. Having a small portion of the hydrochlorate of physostigma dissolved in glycerin, I took a portion of the solution, equivalent to  $\frac{1}{2}$  of a grain of the salt, and diluted it with water until it would flow freely from a syringe. The femoral vein of a dog, weighing 14 $\frac{1}{2}$  lbs., was opened and the liquid injected. Respiration ceased instantly. The muscles became perfectly lax, and there was not a motion or the slightest evidence of pain. Placing my hand on the region of the heart I found it beating tumultuously, but it gradually became slower and in two minutes it ceased altogether. The tongue and mucus membrane of the mouth and throat became quite blue as filled with unarterated blood. The pupils were not contracted. *Post Mortem* examination showed no congestion of the brain, stomach or intestines, which were in a perfectly natural condition. Both sides of the heart were full of blood, and the aorta, down to the bifurcation, perfectly empty. The portal system was tinged with blood, and the inferior vena cava was distended to its utmost extent. This experiment showed that the heart was not immediately paralyzed.

Thinking its action might possibly be similar to that of woorari, I tried the experiment, so successfully performed by our Professor in Physiology. Injecting a portion of the solution of hydrochlorate of physostigma into the femoral vein of a dog, I immediately set up artificial respiration by introducing the nozzle of a bellows into the trachea; the heart continued to beat, as in the previous experiment, for two or three minutes, but I could not prolong its action indefinitely as can be done in cases of poison by woorari.

From the experiments I have tried on these animals it would seem that

the bean itself given in powder is very uncertain in its action. That in cases where digestion was imperfectly performed, or the bowels were actively purged, or in cases where vomiting occurred, the poison showed the least effect. It is my opinion that the active principle is in such small quantities, and intermingled with such a quantity of starch and other inert matter, that unless the digestion be good, perfect, and absorption rapid, its fatal effects are seldom manifested, for in all cases where I used the active principle in concentrated form, extract or hydrochlorate of physostigma, the experiments uniformly showed the poisonous action. From a number of experiments, made with both the alcoholic extract and hydrochlorate of physostigma dissolved in glycerine, on dogs, cats, birds and rabbits, I find applications directly to the eye will produce a contraction that is marked and continuous for longer or shorter time, according to the susceptibility of the eye. Its application to the eye seems to be attended with some irritation, whether it be used in a watery solution or in glycerin."

*Oabig Bark.*—Among the many drugs of doubtful derivation that are sometimes offered in this market, is a yellow bark, stated to be of Japanese origin by the irregular broker who offered it to our friend, Geo. C. Close, Esq. An examination proved the yellow color to be due to a large percentage of berberina, while there is also present a colorless alkaloid, and a higher and a lower saponaceous glucoside. The size of the pieces offered for inspection, some of them several feet in length and breadth, suggested this to be the bark of a plant belonging to the only family, probably, possessing trees of a corresponding size,—that of the Anonaceæ,—and recalled, that a bark identical, from the description of its outer and chemical properties, was described by Dr. Stenhouse, (Pharm. Journ., xiv. p. 455,) and by Dr. Daniell, (*Ibidem*, xvi. p. 398,) referred to *Unona* (*Cælocline*?) *polycarpa*, DC.,—a tree indigenous to Sierra Leone and Soudan, and known in England as *Abeocouta Bark*. Various accounts are given of its medicinal properties, it being a remedy of great repute in the treatment of indolent ulcers and chronic leprosy sores of the extremities, characteristic of the tropics, as an external application, in the form of a coarse powder or decoction. Very extensive use is also made of it on account of its dyeing qualities; and the same bark is supposed to have been introduced for such purposes in England as early as 1787. From the description of Stenhouse and Daniell, little doubt is left on



my mind that this yellow bark, of which a very large quantity still remains unsold, is identical with the Abeocouta bark, and should at least be tried for similar purposes.

As regards the proximate principles of this bark, they are in every respect, except proportion, analogous to those of the officinal *Berberis*, from which latter I have lately separated the pure saponaceous glucoside, and also to those of *Caulophyllum thalictroides*, which latter, however, contains no trace of berberina or any other yellow coloring matter. As to the white alkaloid of *Berberis*,—oxyacanthia,—as prepared by the former method, it differs from that of *Hydrastis* and *Caulophyllum* only because it contains a considerable quantity of the kinovin-like, lower glucoside of these plants, which is especially represented very largely in *Caulophyllum*.

*Sacred Bark.* Under this name the aromatic bark of some large oriental tree has been offered here, and has been referred by several to a Laurinea. It occurs in flat, irregular, heavy pieces, from one-half to an inch in thickness, bearing the marks of a large axe or similar sharp cutting instrument. It has a foliated pale reddish yellow liber, covered with a more or less resinous, reddish envelope and a corky layer, which is deep brown beneath and rough and paler brown, or sometimes ash-colored, without. It has a not over strong odor of Peruvian balsam, or rather of a mixture of cinnamon and sassafras. The outer bark burns with a smoky flame like incense. Mr. Kramer, of Philadelphia, suggested that it resembled storax bark. In fact, as I afterwards found on examination, it contains a soft resin with the odor of storax, but rather rancid, and on being digested in a warm solution of carbonate of soda yields principally cinnamic acid, which, when precipitated from the alkaline liquid by means of sulphuric acid, at once gives the odor of bitter almonds with permanganate. While, therefore, this drug in all probability belongs to a liquidamber, it has no resemblance to what is ordinarily known as storax bark, cortex thymiamatis, as described by Guibourt and others, but bears the greatest resemblance to the description of the trunk-bark of *Liquidamber altingiana*, Blume, as given by Lindley, (*Flora Med.*, p. 321,) in Hayne's *Arzneey*



*pflanzen*, (bd. xi. fol. 26) and especially with that of Noronha, (*Verh. Batav. Genootsh.*, v. 2, p. 1-9) who describes it as follows :

“ Arbor est procera, nubium æmula, erectissima, ad altitudinem lucentorum pedum vel magis majestuose assurgens.—Cortex tegens partim est glaber, partim verrucosus, externe cinereus, interne obscure rubens, cum libra dilute rufescente, odorato, sed non tanta aromaticitate præditus ac in radice. Sapor corticis est asper, amaricans, resinosus, balsamicus. *Lignum* est subrubrum, glabrum, solidum, compactum, madidum, succulentum, ponderosum, *oleo aromatico resinoso imbutum, quod sponte per rimulas varias ad superficiem affluit, vel per incisiones acinacibus Javanorum factas, qui sedulo hæc resinam colligunt, ut odoramentis et topicis medicinalibus inservat.* Oleum effluens consistentiam mellis et colorem primum habet; postea vero fissuris corticis congrumatum, parum albescit, translucidumque apparet cristalli ad instar; guttæ præsertim, quæ scobem non tangunt.”

I have added the description of the wood and balsam which this tree produces, and which account was confirmed by Reinwardt in 1828 (Nees v. Esenbeck, *Med. Botanik*, i. p. 335. Hayne, *l. c.*) because it is not mentioned in that elaborate paper of Mr. Hanbury on storax (*Pharm. Journal*, xvi. p. 423, 465.) This authority rejects as improbable the belief that one species of liquid storax, known in Oriental commerce, as produced in the Red Sea or Indian Seas generally, but assumes that it comes to India by way of Alexandria and Suez. But the similarity of the name under which storax appears in the records of the Port of Bombay, i. e., *Rose Malloes*, with the Malay and Javan name of *L. altingiana*, which is *Rasamala*, certainly suggests some connection. Petiver's geography was no doubt faulty; yet Reinwardt and Noronha state from personal observation that there are forests with many thousands of these balsam trees from which liquid storax was collected. The latter author, after noticing the words of Petiver, as quoted by Geoffroy, continues: *Huc usque descriptio arboris styracem liquidum exhibentis omnes latuit, quam et ego artem tissime videre cupiebam, aliis notitiis evidentibus ductus. Hodie dicere audeo, oculis meis fidem præstans, styracem*

liquidum officinarum ex vera arbore Rasamala fluere ; ab Arabibus *Rasimmala* legitime dicta, a Papuanis *Russimal*, a Persianis *Miha*, et a Cochinchinensibus Roza-malla. Omnes hujus partes arboris excisæ succum lachrymosum resinosum fundunt odoratissimum, *qui est verus styrax liquidus officinarum*, ab Arabibus depuratus et defœcatus, atque ex Moka et Ispahan in Europam allatus. Resina apud omnes nationes orientales magno habetur pretio.”

And, lastly, after refuting the statement of Rumpf, that the tree was indigenous to Zeylon and the Malabar Coast and that the wood was thence brought to Java, Noronha says explicitly that while it was found in neither of those places, yet it grew most certainly in Java, Cochinchina and *several islands of the Red Sea*.

If, as I hope to be able to determine more fully hereafter, this bark should really be found to come from the source to which I have ascribed it, it may become another interesting inquiry to decide whether it be also the *narcaphthon* of Dioscorides, under which name the ordinary storax bark has been supposed to be understood, but which is not an Indian drug.

*New York*, April, 1865.

## THE OFFICINAL FLUID EXTRACTS.

BY THE EDITOR.

Will the officinal fluid extracts go out of use owing to the high price of alcohol, or can we have some authoritative modifications of the formulas by which we may make them at a more reasonable cost? If the latter, shall the change be in the quality of the menstruum, or in the manner of applying it, so as to reduce the quantity requisite? Can there be a convocation of the Committee of Revision to authorize some new method or modifications of the present recipes? These are questions which have doubtless occurred to many others besides ourselves, and are of sufficient importance to warrant an earnest consideration. As early as before the last meeting of the Association, Dr. Edward R. Squibb conceived the idea of using four parts of any given drug

to make three parts of its fluid extract, operating by direct percolation by the official directions, and using only the first liquid that passes, but modifying the manner of proceeding, in some cases, so as to insure the maximum solvent effect from the menstruum. This suggestion of Dr. Squibb was before referred to at page 405, vol. xxxvi. of this Journal. Since that time, he has added further to the evidence in favor of such a plan by careful examinations of the products and residues. The paper and process of N. Spencer Thomas, given in our March number, shows that this subject is engaging other minds; and more recently, in reply to a letter referring to this subject, we received the following reply:

*Extract from a letter from Dr. E. R. Squibb of Brooklyn.*

“Yours of the 9th came duly, and I am glad the spirit moved you to write, even infrequent as it is, since it stirs me up to find time to reply. I do feel a very great interest in the extracts and fluid extracts, and have a strong conviction that it is the duty of the Committee of Revision to meet and adopt some plan whereby these preparations may be saved to the medical profession. If that Committee lets the present official formulas stand till the revision in 1870, not only the formulas will be dead letters, but the value of the preparations will be sacrificed in their popular use. I believe that even now few use the official processes, and those who do cannot sell the articles they make in consequence of the enormous cost. I am willing to work in the matter, but not independently of, much less against, the Pharmacopœia; and Taylor's timely suggestion [at Cincinnati] that the publication of my advice and experiments might tend to weaken the influence of the Pharmacopœia, saved me from doing something very much like what I have since criticized Maisch for,—only that I trust I should never have advised the adoption of my views in practice until justified and authorized by the Committee of Revision. I feel sure that a practical plan could be obtained, by a little labor, whereby preparations of the same practical value could be obtained with the use of less than half the [quantity of] menstruum, and yet with the sacrifice of a comparatively insignificant portion of the drug; but am also equally well convinced that no general rule like the present one can effect this result. Each drug must be worked out by itself, and this done, the process will be found simple and easy. With regard to N. Spencer Thomas' plan, it is no news to say that it is a good one for some drugs, as senna, belladonna, aconite, etc., but for others, such as rhubarb, colchicum seed, nuxvomica, jalap, etc., it is very imperfect, if not impracticable; and as to its being patentable, even as a novel adaptation of a new purpose, I do not for



a moment believe it, since I, doubtless in common with many others, have for years used hydraulic and other pressure for precisely the same purposes and in the same way. For instance, I know of no way to make the official extract of jalap with the proper due proportion of watery extract in it, *upon the large scale*, without using Thomas' plan; and I have used it, and with hydraulic pressure, too, for at least four years past. To moisten the dry jalap powder with alcohol and attempt to press it is futile and useless, because the resin, thick from solution in a small quantity of spirit refuses to flow out, and you might as well try to press the white turpentine out of fine sawdust to the point of practical exhaustion. But after the resin is well washed out by percolation with its proper solvent, the residue, no matter how coarse the solvent within reasonable bounds, if in large quantities, will either absolutely refuse percolation by water, or will percolate so slowly that fermentation sets in long before the prescribed amount of percolate can be obtained. The remedy is to moisten the jalap (after the alcoholic percolation is finished) and submit it to pressure repeatedly, until the press liquors yield, on evaporation, about twice the weight in watery extract that has been previously obtained of alcoholic extract. That is to say, a specimen of jalap which yields, by a critical application of the official process, 40 per cent. of official extract, will yield about 13 or 14 per cent. of resin to alcohol."

We regret Dr. Squibb's unwillingness to publish his results, without authority from the Committee of Revision, and believe it would be better to ventilate the subject in print by giving practical results as a basis upon which to justify a convocation of the Committee, if it be possible. We have thus called attention to this subject, and shall be pleased to receive comments from other observers and thinkers who may be disposed to communicate their views or results.

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#### ON PIL. FERRI CARBONATIS AND P. FERRI IODIDI.

BY P. W. BEDFORD.

[In a letter recently received from Mr. P. W. Bedford, of New York, the following remarks occur, which, with permission, are inserted in the *Journal*.]

"I send you a sample of Pil. Ferri Carbonatis made some three months ago, in which the weight of honey and sugar are exchanged, or in other words *three* troyounces of sugar and *two* troyounces of honey. Mr. Neergaard uses the proportions of *four* of sugar to *one* of honey.



You will also find some Pil. Ferri Iodidi made by the following formulæ, of which I spoke to you last September :

Take of Iodine, eighty grains.

Reduced Iron, forty grains.

Water, twenty-five minims.

Honey, thirty grains.

Marshmallow, in fine powder, one hundred and twenty grains.

Rub the Iodine in a mortar to a fine powder, adding first the water, then the honey, and afterwards the reduced iron in portions and triturate until the iodine is entirely converted into iodide. Add the marshmallow, and, having formed a pill mass, divide into ninety-six pills. Coat them with tolu as directed in the Pharmacopœia. I also send some made by a friend (Dr. Wm. B. Little) by the Pharmacopœia process, made with half the quantity of gum and equal parts of marshmallow and liquorice root.

Blancard's pills, when cut, have a light brown surface, those of the U. S. Pharmacopœia have a dark brown, almost black, surface."

The Vallet's mass, at this date, (six months since it was made,) is of good consistence and color, no tendency to crystallize and be gritty is noticed. The original recipe was five ounces of honey (Ph. 1840,) in 1850 it was made as at present. Others besides Mr. Bedford have increased the proportion of sugar to avoid deliquescence. There is no doubt that the Pharmacopœia proportions are best calculated to preserve the carbonate from oxidation, but the liability to attract moisture in damp weather, due to the honey, is an inconvenience seriously interfering with their long continued use, unless kept in a bottle as they should be.

The iodide of iron pills, sent by Mr. B., are of good consistence, and appear perfectly protected at this date. We have some of these pills, made by the U. S. Pharmacopœia process four years ago, that are equally perfect, although they have not been kept sealed. The suggestion of Mr. Bedford has reference to convenience of dispensing, and to the consistence of the mass, which the gum of the Pharmacopœia probably makes a little too elastic. These suggestions do not alter the strength or medicinal

qualities of these pills, and, therefore, are admissible, if pharmacutists desire to vary these recipes.—ED. AM. JOURN. PHARM.

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## PREPARATION OF PEROXIDE OF BARIUM.

By B. C. BRODIE.

Peroxide of barium, prepared by passing oxygen gas over heated baryta, is useless for many purposes, because the oxidation of the baryta is never entirely accomplished, and the product contains a considerable amount of oxide. The first step to the preparation of the pure peroxide is that of the raw materials.

When oxygen gas is carried over a piece of baryta, heated in a porcelain tube, the absorption of the gas immediately takes place with great rapidity; and when the heat is properly regulated, no trace of oxygen escapes from the apparatus. It is, nevertheless, very difficult, however long the action of the oxygen may be continued, to prepare a peroxide in this manner which contains more than 6 parts oxygen to 100 parts of baryta. The theoretical amount of oxygen required for the formation of peroxide, is 10.46 parts to 100 baryta.

By far the most simple and practical process for the oxidation of baryta is that proposed by Liebig, which consists in exposing an intimate mixture of baryta and chlorate of potassa to a gradual heat. The mixture is introduced, little by little, into a crucible, heated to dull redness: as soon as the chlorate of potassa melts, the mass begins to glow. The melted mass is powdered and exhausted with water, which leaves behind an insoluble residue, containing a large amount of superoxide of barium. But in this product, also, the proportion of oxygen does not amount to more than half the requisite quantity, and must, therefore, be regarded as a sesqui-oxide of barium.

In order to obtain pure peroxide of barium, the crude product obtained by the above process is finely powdered, trituated in a mortar with water, in order to reduce it to a hydrate, then carefully mixed slowly with dilute hydrochloric acid till it gives an acid reaction, the solution filtered, and again made alkaline with baryta water. The addition of the latter causes a precipitation of the alumina and oxide of iron. The alkaline solution, which

immediately begins to decompose, is quickly strained through linen, and an excess of baryta water added to the clear filtrate. By this, the hydrated peroxide of barium is precipitated in shining plates, which are insoluble in water, and can be washed by decantation. In order to be certain that all the peroxide is precipitated, a small portion of the liquid may be filtered and tested with a dilute solution of the bichromate of potassa. (In case peroxide of barium is still present, the addition of this reagent causes a blue coloration of the perchromic acid.—Wittstein.)

The washed precipitate is to be collected on a filter, pressed between filtering paper, and dried under an air pump, by which all the water of crystallization can be removed. The dried peroxide then has the form of a white, fine powder, similar to magnesia, and the formula  $BaO_2$ ; is anhydrous, is contaminated by a trace (at the greatest) of carbonate of baryta, and is entirely stable.—*Vierteljh. Ph.*, xiv. p. 80. G. J. S.

## NOTES ON MATERIA MEDICA.

BY PROF. ARCHER.

### 1. *Notes on a New Species of Gall from China, with references to other unusual Commercial Galls.*

Since the greatly increased demand for gallic acid, which has been caused by the requirements of photographic chemistry, much interest has been felt in obtaining galls from various parts of the world from which to procure that acid. One of the first new products of this class was the Chinese gall, described by Dr. Pereira in the "Pharmaceutical Journal," vol. iv. p. 384, 1844, under the name of Woo-pe-tsze. These have now become regular articles of commerce, and so also has a similar one obtained in Japan, rather smaller, but apparently produced on the same tree, or a closely-allied species. Mr. Daniel Hanbury, who has carefully examined the Chinese galls, is of opinion that they are produced on *Rhus semi-alata*, and Mr. Doubleday, the entomologist, has shown that they are caused by an aphis, and not by a cynips, as in the case of most other galls with which we are acquainted.

Next came a small gall from India, called by its Indian name Mahee; this is yielded by two species of Tamarisk, (*Tamarix indica* and *T. furas*;) they are very rich in gallic acid, but are not procurable in very large quantities. The shrub, however, grows in Algiers, and there it appears to yield the galls more abundantly, as very considerable quantities are exported to France under their Moorish name Takaout. There is a curious gall, shaped somewhat like an ox horn, and about two inches or two and a half inches in length, which has a commercial value in India but has not yet found its way into our markets, it is called Kakarasinghee or Kakrasingee, and is produced on *Rhus Kakrasinghee*, (Royle;) they are, to a small extent, used by the Indian tanners, and have also a place in the Materia Medica of India; possibly, ere long, they may become articles of import into this country.

The gall most extensively used in Southern Germany is the curious Knopperrn, produced by the puncture of a species of *Cynips* on an oak-tree,—*Quercus Cerris*. These have been imported occasionally, but are very inferior in quality to the common Turkish galls. In Italy, France, Turkey, and India the galls formed on several species of *Pistachio*, as *Pistacia vera*, *P. lentiscus*, etc., are used, and those from *P. lentiscus* are largely used for tanning in Turkey and Italy. Their value is not known in this country.

The latest novelty is a very curious gall which I have just received as an import from Shanghae; it bears strong resemblances to the Chinese and Japanese galls, but has not their peculiar branched appearance; on the contrary, it has mostly the form of a radish-pod, and, although some are slightly tomentose, as in the case of the other two, yet most of them are smooth; here and there we find amongst them some which have a tendency to the branched form; indeed, these galls seem to be intermediate in their general characteristics between the Kakarasinghee and the Woo-pe-tsze. They were lately imported into Liverpool, and doubtless will soon become common.

## 2. Note on a New Article of Commerce, called Cape Saffron.

This remarkable product, which strikingly resembles saffron,



in all but its color, is the dried flower of a very small plant, extremely common in some parts of the Cape of Good Hope, taking there the place of our common Toadflax,—*Linaria vulgaris*,—and belonging to the same Natural Order,—*Scrophulariaceæ*. It yields a color like that of saffron, and, what is very remarkable, it yields it as readily when mixed even with cold water; moreover, its odor is that of good saffron, and equally strong; two importations have taken place, the first about five years since, which was only a small sample, the latter about 70 lbs. weight; the former shared the fate of thousands of valuable products, it was buried in a drug-broker's drawer; the latter is in the hands of an intelligent merchant, Mr. David Bain, 50 Stanhope Street, Hampstead Road, London, who is fully alive to the value of bringing forward the economic products of the Cape. Dr. Papé since called attention to the uses of this plant, and the following quotation is from his "*Floræ Capensis Medicæ Prodrômus*:"

"This bush deserves notice as a drug, and in all probability will, ere long, become an article of colonial export. It grows abundantly in some parts of the eastern districts, whence it has found its way into the dispensary. The flowers, which are called *Geele bloemetjee*, closely resemble saffron in taste and smell; they possess similar medical properties, and as an antispasmodic anodyne and stimulant, ought to rank with the *Crocus sativus*. Here, they have as yet been only used with success in the convulsions of children, but they deserve a more general trial. On account of the fine orange color which they impart, they are in daily request among the Mahomedans, who use them for the purpose of dyeing their handkerchiefs. This drug has been observed to be sometimes adulterated by the admixture of other plants of the same genus, which are less efficacious."

### 3. Note on a New Product, called Cubebs, from South Africa.

This material has been sent from Cape Coast Castle, under the name of African Cubebs. It has, however, no relationship to *Cubeba officinalis*, or any other pepper, but belongs to the Natural Order *Xanthoxylaceæ*, which is celebrated for the agreeable pungency of the fruits of many of its species, especially in

the genera *Toddalia* and *Vepris*, to one of which it undoubtedly belongs. I believe it is the fruit of *V. lanceolata*, (A. Jussieu,) the *Toddalia lanceolata*, (Lamk. ;) this plant is pretty widely diffused, for it is found in the Island Mauritius, and is also common in the woody districts of various parts of the Cape of Good Hope. There is some slight resemblance to cubebs in this drug, but the slightest examination shows that it has no affinity with the peppers ; its dry, dehiscent capsule, with the hard, bluish-black, shining, kidney-shaped seeds, and the membranous remains of the abortive cells, are distinctive characters which are quite sufficient to prevent any mistake. The properties are simply aromatic and stimulant, without any approach to the special properties which cubebs exercise upon the urinary organs. —*London Pharm. Journ.*

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#### THE BRITISH PHARMACEUTICAL CONFERENCE AND THE AMERICAN PHARMACEUTICAL ASSOCIATION.

At the first sitting of the Conference at Bath, September 14, the President stated that he had received a communication from the Secretary of the American Pharmaceutical Association, informing him that an address of salutation and gratulation had been agreed upon, an engrossed copy of which had been forwarded to the present meeting. The President further explained that, owing to some accident, the said engrossed copy had not come to hand, but recommended that the extract from the volume of Proceedings, relating to the resolution, should be accepted in its place, which was immediately agreed to, and the Secretaries were ordered to draw up the draft of a reply, to be submitted for the approval of a future sitting.

At the final sitting of the conference, on September 19th, it was determined that the following resolution should be forwarded to the American Pharmaceutical Association, in reply to its address :—

Resolved :—That the members of the British Pharmaceutical Conference have received with much satisfaction the friendly greetings of their brethren of the American Pharmaceutical Association. They appreciate these expressions of goodwill the more highly, from their being spontaneously offered at so

early a stage in the existence of their own Society, and they see, in this circumstance, evidence that their American brethren are watchful observers of all endeavors for the advancement of pharmacy wherever made. The members of this Conference trust that such an example will not be without its influence in this country, and desire to record their feeling that the scientific labors of American pharmacutists are worthy of being more extensively known in Great Britain than has been the case hitherto.

“This conference heartily reciprocates the expression of feelings of interest and goodwill towards the American Pharmaceutical Association, and will gladly embrace all opportunities for communication with its members, several of whom are honorably known in England through their scientific researches.”  
—*London Pharm. Jour.*, 1864.

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#### THE PRESERVATION OF LEECHES.

To the Editor of the Pharmaceutical Journal:

SIR,—The constant loss sustained by retail dealers in leeches, especially by living in small towns where the demand is uncertain, has been a subject of discussion for many years.

Various vessels have been constructed, and many contrivances proposed to avoid loss, but I do not know of one which has answered perfectly.

The aquarium is perhaps the prettiest and most scientific, but there are difficulties connected with its use.

For nearly twelve months I have adopted a very simple, but very effectual remedy for the preservation of these useful creatures in a healthy condition, and securing me against loss.

I use an ordinary ornamental leech-jar, change the water daily, keep the jar clean by means of a sponge kept for the purpose; three-parts fill the jar with good spring water, and throw in ten, twenty, or thirty grains of the oxide of manganese, washed and levigated for dispensing purposes.

I consider about thirty grains is enough for 100 leeches, and renewed daily.

I now never see an unhealthy leech in my stock. I was led to adopt this plan by witnessing the beneficial effects of manganese administered to patients. If you think the above worth



publication in your journal, I hope many chemists will profit by my experience, and I shall be glad to hear that the same experiment, tried by others, yields results as satisfactory.

I remain yours truly,

C. F. BEVAN.

Harwich, February 14, 1864.

—*London Pharm. Journal.*

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#### EXPERIMENTS ON THE ACTION OF THE AIR ON VEGETABLE FATTY OILS.

By M. S. CLOEG.

It may be asked under what form the carbon and hydrogen are eliminated in the course of the oxidation of oils. I agree with Saussure, that a portion of the carbon passes to the state of carbonic acid, but I have, moreover, ascertained that the amount of carbonic acid produced does not nearly represent the whole of the carbon which has disappeared.

In the same way with hydrogen, part is disengaged as water, but it is also eliminated under some other form.

These facts are easily explained by the production of a carbonised volatile compound, the pungent odor of which greatly resembles that of acrolein; this is a substance which browns the sheets of unsized paper, serving to recover the oils exposed to the air.

Some old books are colored in the same way, and I believe that this coloration is the result of the slow oxidation of the oil used in the printing ink, and the formation of a product possessing a stifling odor, similar to that which I have recognized in air which has been for about ten days in contact with a siccative oil.—*Lond. Chem. News*, March 24, 1865.

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#### ALCOHOL AS A TEST FOR CROTON OIL.

Mr. R. Warrington, F. R. S., has published in the *Pharmaceutical Journal* some experiments on the British Pharmacopœia test for croton oil, which have led him to conclude that the use of alcohol as a test for the purity of the oil is of no value. His own opinion, he states, is that freshly expressed oil, or rather oil expressed from fresh seeds, either abroad or in this country, does not dissolve in alcohol sp. gr. .794—.796 to a



greater extent than 20 per cent. at 50°; but that if croton oil has undergone a chemical change, such as resinification or oxidation by time and exposure to air, or has been expressed from seeds which have become changed in the same manner, then the oil is freely dissolved by the alcohol. It follows that "a test which is open to many weighty objections, both from the influence of small fluctuations of temperature, and for indicating the purity of material liable to such marked differences from the effects of such natural, and in some cases inevitable, chemical changes, is perfectly useless as a reliable indication of purity."—*Chem. News*, Feb. 3, 1865.

#### COCHINEAL COLORING.

For the following formula we are indebted to Dr. George, Dickson, of Edinburgh:—

"Cochineal coloring may be prepared without admixture of carbonate of potash, alum, etc., as follows:—

Take of—

Cochineal in powder, 1 oz.

Spirit of wine, 2 oz.

Water, 6 oz.

Liq. Ammon. Fort., q. s. (about  $\text{m}$  viij.

"Mix the spirit and water, and in three ounces of the mixture, heated to near the boiling-point in a flask, infuse the cochineal for fifteen minutes. Pour the infusion into another vessel, and repeat the process with three ounces more of the mixed spirit and water; and a third time, with the remaining two ounces. Let the liquid stand till cold, when some fatty matter will rise to the surface; filter, adding spirit and water, up to eight fluid ounces. Lastly, add sufficient Liq. Ammon. Fort. (about  $\text{m}$  i. to  $\text{3i}$ ). to change the infusion to the desired tint.

"The objections to the use of carbonate of potash, alum, etc., are:—1st, The coloring-matter is thrown down as a lake, and after some time, forms a layer at the bottom of the containing vessel, requiring the addition of ammonia to redissolve and keep it in solution; and 2d, it does not keep well. On the other hand, the advantages of this preparation are:—1st, the coloring-matter remains in solution, and 2d, it keeps well, and has no unpleasant odor."—*Lond. Pharm. Journal*.

## ON THE BOTANICAL ORIGIN OF SAVANILLA RHATANY.

BY DANIEL HANBURY, F. L. S.

It is a fact well known to druggists that the Rhatany Root which formerly found its way into European commerce from Peru, has to a great extent been superseded by another and very excellent form of the drug exported from New Granada, and commonly known in the market as *Savanilla Rhatany*. But from what plant this latter drug is derived, or in what part of the vast territory of New Granada it is produced, are points upon which I believe that no definite information has yet been published.

Having endeavored during some years past to elucidate these questions, but without much success, I gladly took occasion of the recent mission to New Granada, of Mr. John Weir, collector to the Royal Horticultural Society, to suggest that enquiries should be made at Santa Marta regarding *Savanilla Rhatany*, and that Mr. Weir should, if possible, visit the locality where the root is collected. The Royal Horticultural Society having accorded permission to Mr. Weir to devote some attention to this object, he soon succeeded in ascertaining that the rhatany in question is obtained from the vicinity of Jiron, a small town lying to the west of Pamplona and about midway between it and the river Magdalena. To this place, Mr. Weir directed his course, arriving there in the latter part of January, 1864, when he thus wrote ;

“*Jan. 31st.* Enquiring to-day where the Rhatany plant was to be found, Mr. L. informs me that in various places among the naked hills and savannahs around, the plant grows in plenty, but none nearer than a short day’s journey from Bucaramanga. He told me, also, that he used to export large quantities of the drug, but that he had lost \$2000 by the last lot he sent away, and had not sent any for the last twelve months. I saw, however, a quantity of the root in another house, packed in bags ready to be sent away.

\* \* \* \* \*

“*Feb. 1st.* Started this morning for the valley of Jiron. A few leagues above the village of that name the Rhatany was said to be common, much of the root being there dug for export.

The road lay upon the bottom of the valley, following the course of the stream the whole way. Two leagues above the village the plant begins to be frequent, and a league further on there are large tracts covered with it. The soil it grows in is arid, hard, and gravelly in the extreme, so much so that in taking up the root the instrument used is a strong iron crowbar, a little flattened at the lower end; from the same cause the roots are generally broken into small pieces in the process, it being rather brittle when fresh. The general height of the plant is about four feet; but in some places it seems to grow stronger than in others, and I saw considerable patches of the shrub quite six feet in height.

"I gathered many specimens of the plant in flower and fruit, and also a small specimen of the root attached to the stem and branches."

The specimens here alluded to, consist of the pressed and dried plant bearing flowers and fruits, and stems with roots attached, the last being in every respect identical with the *Savanilla Rhatany* of commerce. A slight examination sufficed to prove the plant a species of *Krameria*, and the next point of interest was the determination of the species. Turning to the newly published *Prodromus Floræ Novo-Granatensis* of MM. Triana and Planchon, one finds three species of *Krameria* there enumerated, namely *Kr. Ixina* L., *Kr. grandiflora* St. Hil. and *Kr. spartioides* Kl., to the first of which Mr. Weir's plant proved to be most nearly related. Unfortunately no specimen of *Kr. Ixina* now exists in the herbarium of Linnæus, but in that of the British Museum there are two, representing that form of the plant which has been figured by Hayne. From this type, the New Granada plant differs in having leaves which in the young and vigorous shoots have a spatulate rather than lanceolate outline, besides which they are somewhat more hirsute. In flowering shoots of less luxuriant growth, these differences are far less marked, and the plant in this state appears to vary but little from the true *Kr. Ixina*. The flowers and fruits do not present, so far as I have observed, any marked differences.

Upon showing Mr. Weir's plant to my friend Dr. Triana, he at once identified it as the *Kr. Ixina Prodromus Floræ Novo-*

*Granatensis*, distinguished in his MS. notes as var.  $\beta$ . *granatensis*. Considering the present state of our knowledge of the species of *Krameria*, Dr. Triana's determination of this plant as a variety of *Kr. Ixina* appears to me highly judicious, and far safer than the introduction of a new specific name, which the receipt of further specimens would probably show to be untenable. I therefore accept *Krameria Ixina* L. var.  $\beta$ . *granatensis* of Triana as the plant, the dried roots of which constitute the drug known as *Savanilla Rhatany*.

This form of *Kr. Ixina* has an extensive geographical range, for besides occurring in the locality already mentioned, it exists in Brazil, where it was collected in the Island of Itamaraca, near Pernambuco, by Gardner, who described it as "a shrub about three feet high with long spreading branches." Another specimen from the same botanist in the Hookerian Herbarium, is labelled "common on dry hills in the Sertão of the province of Ceará.—*London Pharm. Journal*, March 1, 1865.

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#### ON THE SOLUBILITY OF CAMPHOR IN WATER.

BY GEO. F. H. MARKOE.

"What is the proportion of *camphor* present in the official 'Aqua Camphoræ?'"

To prepare camphor water, in accordance with the directions of the United States Pharmacopœia, we take of

Camphor, 120 grains.

Alcohol, 40 minims.

Carbonate of Magnesia,  $\frac{1}{2}$  a troyounce.

Distilled Water, 2 pints.

Rub the camphor first with alcohol, then with carbonate of magnesia, and lastly with the water gradually added, then filter through paper.

All the authorities, whose works are at my command, agree in saying that camphor is soluble in 1000 parts of cold water.

Storer, in his "Dictionary of the Solubilities of Chemical Substances," states, "From an intimate mixture, *camphor* with carbonate of lime or carbonate of magnesia, water is said to take up three times as much *camphor* as when shaken with *camphor* alone." Storer makes no mention of the method em-



ployed to determine the amount of *camphor* taken up from its mixture with carbonate of magnesia, nor do the authors of the United States Dispensatory state how they prove the presence of "*fifty grains*" of camphor in each pint of official water.

The only hints, contained in the standard works, that suggest a method by which the quantity of camphor in the official water might be determined, are the statements that "*solution of potassa*," *sulphate of magnesia* and some other salts will separate *camphor* from its aqueous solution.

To test the truth of these assertions the following experiments were instituted :

1st exp. Two pints of camphor water were treated with solution of potassa, which threw down a bulky flocculent precipitate, which was collected on a small filter and dried between folds of bibulous paper, by which treatment it lost nearly all its bulk, leaving a very small quantity of a light-brown colored substance on the filter, which was insoluble in water and alcohol, but the greater part readily dissolved in dilute hydrochloric acid with effervescence.

2d exp. Sulphate of magnesia was added to two pints of camphor water as long as it caused a separation of camphor, and a few grains were obtained floating on the surface of the liquid.

3d exp. *Four ounces* of chloride of calcium were added to *two pints* of "camphor water," and the camphor which rose to the surface was collected on a filter. Two more ounces of the chloride were added to the filtrate without causing the separation of an additional quantity of camphor. The camphor on the filter was washed with camphor water, dried between folds of bibulous paper, dissolved in a very little chloroform, the solution evaporated spontaneously, and the camphor obtained weighed *six grains*.

4th exp. One pint of camphor water was shaken with stronger ether, and set aside to let the ether separate. When this was accomplished, it was carefully decanted from the water and then evaporated spontaneously, but without yielding camphor.

5th exp. One pint of camphor water was treated with chloroform with negative results.

From the above experiments we may conclude that neither of the reagents used possess the power to remove camphor from its aqueous solution more than to a very limited extent, while three—solution of potassa, ether and chloroform—failed entirely.

I then turned my efforts to getting out the undissolved portion of the *camphor* mixed with the carbonate of magnesia. After many experiments the following process was adopted as giving the most satisfactory results :

1st exp. Two pints of camphor water was carefully prepared, and the magma of carbonate of magnesia and camphor remaining on the filter was transferred to a small beaker, and treated with dilute sulphuric acid in very slight excess, thereby dissolving the magnesia as sulphate, while the camphor rose to the surface and was collected on a small filter, washed with camphor water, to remove adhering sulphate of magnesia, dried between folds of bibulous paper, by which means it was obtained in the shape of a dirty, gray cake, mixed with the impurities derived from the carbonate of magnesia and shreds from the filter. To obtain the camphor pure, the mixture was treated with chloroform, the solution thrown into a small funnel, the neck of which was stopped with a little cotton ; and finally, the camphor obtained by the spontaneous evaporation of the chloroformic solution, was carefully weighed, and gave a yield of *fifty-five grains*.

2d exp. With like quantities and manipulation gave a yield of fifty-nine grains.

3d exp. do. do. fifty-four grains.

4th exp. do. do. fifty-six grains.

The average amount obtained by these experiments being fifty-six grains ; deducting fifty-six (56) grains from the one hundred and twenty (120) grains of camphor used in each experiment, gives a difference of sixty-four (64) grains, which must represent the amount of camphor present in *two pints* of the officinal “Aqua Camphoræ,” being of the proportion of *two grains* in each fluid-ounce of the finished preparation, or one part of camphor in two-hundred-and-forty (240) parts of water. Storer’s statement that “water takes up three times as much camphor from its intimate mixture with carbonate of lime or magnesia than when shaken with camphor alone, (assuming it to

be a fact that, in the latter case, but one part of camphor is taken by 1000 parts of water,) will make the limit of solubility one part of camphor to three hundred and thirty-three and one-third parts of water ( $333\frac{1}{3}$ .) Perhaps the greater amount obtained in solution by following the directions of the U. S. Pharmacopœia, may be well explained by the preliminary trituration of the camphor with alcohol previous to its mixture with the carbonate of magnesia.—*Proceedings of the American Pharmaceutical Association*, 1865.

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### THE PHARMACEUTIST AS A MERCHANT.

BY FREDERICK STEARNS.

That which constitutes “commercial education” in relation to the pursuit of all usual forms of business, is capable of being applied to the Pharmaceutist, there being, however, special points relating to each, and those whatever they may be, it is presumed are the ones to be touched upon in any essay upon commercial education in relation to the successful pursuit of the Pharmaceutic art.

Taking it for granted that the novice has acquired during his minority a fair share of the “King’s English,” has even graduated at a school of Pharmacy during his apprenticeship, then the following remarks may be usefully applied:—

Commercial education, or the knowledge of those methods of conducting business by means of which pecuniary success and an honorable position in community are obtained, is of course the fruit of experience only in the vast majority of instances.

The social position of the Pharmaceutist, in our country at least, is fully equal to that of those following successfully other channels of trade. Its pursuit implies a cultivated mind and scientific tastes, and as we acknowledge no aristocracy but that of mind, the necessary qualification of professional skill in our art ennobles it.

It is of primary importance that the beginner should enter upon the pursuit of Pharmacy enthusiastic, earnest, and with unbounded ambition to succeed and excel; to be in love with it, and with a firm determination to let no trivial disappointments turn him from his course.

I believe it true that the discouragements are greater to the beginner in Pharmacy as a business, than in many other pursuits, because the demand for the products of our skill is limited in comparison with that for most great staples of trade which busy the business talents of the mass of our fellow-men; moreover, a community take to a new Pharmaceutist shyly and slowly, confiding in him only as they come to know him.

Choose, then, Pharmacy as a business in the profound conviction that you were born for it, and not take it up on trial to be thrown aside for some other. Are you hopeful? So much the happier will you be, for anticipation of success is about equal to its reality.

Don't try and stand alone until you have reaped the benefit of an apprenticeship with some experienced and successful preceptor, during which you have enriched your mind by reading, study and schooling in Pharmacy, and acquired those business ways and habits which have led him, whose example you study, to success. This preliminary education is of such vital importance that the want of it can never be compensated by the slowly accumulated experience of an active life of years. I know of many young men who, after a stay of one or two years in a subordinate position in a drug store, have started in business full fledged, in their own belief, as capable and experienced Pharmaceutists; such gravitate naturally to the position in which they properly belong among merchants, remain incapable and become obscure.

We all know this *hasty* tendency is peculiar to American youth; ambitious to reach the goal of future hopes, it leaves the formation of correct business habits to the chance of coming years; this it is that crowds our cities and towns with so many ignorant druggists—men who pick up the business of Pharmacy as they would that of selling Yankee notions, live and succeed in a small way, or fail ingloriously; in either event, blissfully ignorant of the capabilities of the art in whose borders they have to tread.

After a varied experience of twenty years in Pharmacy, I am possessed of the strongest conviction that a rigid adherence to principles of integrity, to honor and to truth, in conducting our business, is most surely conducive to its success; therefore,



business *policy* should dictate such conduct aside from moral conviction.

We all know a thousand *tricks* in trade, the prevarication, the exaggeration and other nameless ways of making things appear as they are not, and which so often overshoot the mark, till it is a common thing for the community to allow an ample margin on almost every thing that comes from a drug store, between semblance and reality, utterance and truth. This is not as it should be; for truthfulness, in all our ways, is the best business policy, as it is most satisfactory to the conscience.

Now, supposing our beginner to be possessed with a fair education, moral, ethical and scientific, but no experience as a business man, what points are there to be observed in trade that will be most likely to lead to pecuniary success?

There are many, of small importance singly, but in the aggregate help to swell the tide that leads on to fortune.

The Pharmaceutist as a merchant *must be* industrious; the details of the business are so numerous as to tax, almost to its utmost, his endurance and patience.

When the aggregate yearly business is any considerable sum from the retail sales of medicines and accessories, the details to accomplish that require a vast number of steps and much labor of hand and brain; so it becomes a fixed fact that there is no moment, in a well organized business, that there is not something to do; there *are* no leisure hours.

This industry must be *personal*, too, in a proprietor, to be seconded by his assistants; this industry also implies a personal eye to all the details of a business, consequently there can be little leisure for outside occupations; better do one business well than trust to the chances of success in two or three at once, none properly conducted.

What is termed business *tact*, as it may be applied to our art, consists in knowing, as it were intuitively, how to win friends and draw customers around you.

It is shown into a proper selection of a business stand. Had I the choice between a good stand with little means to expend in fixtures, and an indifferent one with rich fixtures, I should choose the former, trusting to the future to make up the last want.

It is shown in the fittings of a store; rich without extravagance, or plain with neatness, either may be elegant. Convenience and appliances which favor the *rapid* dispatch of business, should not be overlooked as a saving of help and labor, and consequently a means of profit.

Tact is particularly shown in a courteous bearing towards customers, implying an appreciative sense of their patronage, with a self-possession and manly self-respect that is above fawning or flattering. Here it is that an intelligent understanding, or knowledge of the goods in which we deal—their history, their merits, their qualities, their peculiarities—is of such great assistance in our business in making sales. If you possess the ability (and you should possess the will) to explain to the customer, with curiosity excited, that which he seeks to know, or to impart that which you have led him to desire to know, and you do it in a self-confident yet truthful way, it is always a great point gained; that customer will always respect your intelligence; his opinions in all that relate to the art will be moulded by your own, and he will be sure to be your regular patron.

I believe in stating the merits of an article decidedly and truthfully; good goods tell no after-tales of deceit; poor ones, well puffed, most surely will.

Business tact is shown in treating your clerks as if they were friends, and so making them such. Kind words and even temper are consistent with a sufficiently rigid discipline; remember, that the example by word and deed of a proprietor will produce lasting effects on the impressible characters of your young apprentices, bearing fruit in future habits and business ways.

Business tact is shown again in keeping pace with the age in which you live—to be ready with all the innovations, novelties and sensations in the medical world—experimentally, of course, at first; and, while you do not endorse such necessarily by your own approval, you should be ready to supply them.

It is shown in the careful selection of the stock of goods, particularly where means are limited, watching the demand so as to apportion it correctly, so that no overplus of some

items may lesson your ability to keep a full assortment of goods.

It is shown in guiding the market yourself, not letting it guide you ; strive to lead the *tastes* of your customers towards those kinds or qualities of goods which you know to be best for them, better than they themselves do. I hold this to be a duty which none of us should be indifferent to.

Business tact is shown in so individualizing your business that everywhere possible the articles sold by you should represent *you*, not some one else ; make everything yourself that it is at all practicable for you to make, and if your skill is such that whatever you make represents the best of like articles, then each item of such sold is a standing advertisement for you to win additional trade. I am a firm advocate of the practice of each Pharmacy being a producing one ; it is no credit to a man, who has been well educated in this art, to be contented to live long and sell only the products of others' industry, when he might better make his own, increasing his business and reaping the additional portion of profit thereby.

Business tact so displays goods as to make the most of them, so in a measure to help them sell themselves ; therein neatness and taste go hand in hand with industry.

While business tact will lead the merchant, desiring success, to deal in all the articles of his line that the public calls for, there are in ours very many things that, which to do, is more or less to compromise with the right and wink at the wrong ;—the alcoholic stimulants under the guise of medicated bitters—the regulating remedies, so advertised as to furnish a ready means for criminal purposes—add to these almost the whole list of the so-called patent medicines ; all these the intelligent Pharmaceutist knows are pernicious in their effects upon the public health, and yet how feeble are his efforts to retard their sale, how weak his protest against their use. If you do deal in such, be independent enough to make the sales of them depend upon the natural law of *demand*, and *not* on your efforts ; do not, above all things, ever endorse them with breath of praise.

About advertising, that is also a legitimate means of making yourself known, but how best to do it to reap the largest re-

turns for the smallest proportionate outlay is an art in itself, and one that each must learn by himself.

After all said about business tact, business success will be dependent upon keeping and selling those qualities of goods, in every department of your trade, that are intrinsically good, and he who takes, in that respect, the highest stand will reap the greatest reward.

The greatest *reward* lies not only in money gains, but in reaching that honorable position in community wherein you are looked upon as a public benefactor, in seeking honest profits and not being a Shylock. It gladdens me to remember professional friends who are poor, perhaps, in pocket, but rich in possessing the respect and affection of their neighbors, while my mind's eye rests on an occasional one who is poor in everything that can make a man *poor*.

The economical administration of business affairs will commend itself to all who mean to win success; and, while a commendable share of enterprise is to be advised, a proper mixture of caution is quite as valuable.

Men of scientific tastes are not apt to be good financiers; such tastes render them careless of money; they rarely understand economy in business, and in business they trust their finances to others not vitally interested. The Pharmaceutist should know at all times how he stands in credit and purse; "cutting your coat according to your cloth," and the host of similar commercial maxims, commend themselves forcibly to his attention.

Great is the field for the inventive faculties to play in pursuit of Pharmacy—devising improvements in formulæ, shortening methods, improving apparatus, introducing new, unique and original designs in labels, bottles and various similar things. Don't be a mere copyist of others, but add something, during a lifetime, to the sum total of taste and improvement.

It is surprising how the little elegancies, and nice nothings, aid the business of the prosperous and enterprising Pharmaceutist.

Professional men are not given to business-promptness; don't let the title of *professional*, which is attached to our art, lead to



any such careless habit as a want of promptness in fulfilling any and every promise to do or promise to pay.

So varying and peculiarly are the auspices under which each young man enters business, that it is not likely that the foregoing covers all the ground designed for a reply to the query I accepted; these several points, however, may, if acted upon, be conducive to a proper estimate in the minds of some of the right paths to follow in acquiring a commercial education.—*Proceedings of the American Pharmaceutical Association*, 1865.

Detroit, Mich. Sept., 1864.

## ON ÉSÉRINE, THE ALKALOID OF THE CALABAR BEAN.

By MM. A. VEE & M. LEVEN.

The authors begin with pointing out that the *physostigmine* of Jobst and Hesse only possesses some of the characters of an immediate principle, and is, in fact, a mixture of several bodies, of which the most considerable is a crystallisable body which they call *ésérine*. This is obtained in the following way, which, it is said, is a modification of the process of Stas for separating alkaloids in cases of poisoning.

Calabar beans reduced to a fine powder are exhausted by cold alcohol. The alcohol is carefully distilled from the tincture, and the extract is treated with a strong solution of tartaric acid. After some time the mixture is diluted with water, filtered and then supersaturated with bicarbonate of potash. The whole is now shaken with ether, and the ethereal solution separated gives on evaporation the alkaloid contaminated with foreign matters. The extract is dried over sulphuric acid, and then re-dissolved in pure anhydrous ether, from which solution the alkaloid is obtained almost pure. Repeated solution in alcohol or ether remove all the impurities, but a little red coloring matter which obstinately adheres.

*Esérine*\* is a crystallisable solid of a faintly bitter taste, which is not immediately perceived. It is freely soluble in ether,

[\* This new name is uncalled for; we hope the original name, from the genus of the plant, will be retained by chemists.—ED. AM. JOUR. PHAR.]

alcohol, and chloroform, and but slightly soluble in water. It crystallises in thin rhombic plates, which are colored by polarised light. The aqueous solution has an alkaline re-action. The alkaloid is soluble in acids; the solution gives all the ordinary general tests for alkaloids. The solution acts powerfully upon the pupil.—*Lond. Chem. News*, Feb. 17, 1865.

## ANALYSIS OF KOLA NUTS,

BY J. ATTFIELD.

Dr. Attfield communicated the results of an analysis of the kola nut. He sought first for theine. A decoction was precipitated by basic acetate of lead, excess of lead removed by sulphuretted hydrogen, and the clear solution left evaporated to dryness. The residue was digested in hot alcohol, and the alcoholic solution evaporated to small bulk. This, when cold, solidified to a mass of crystals, which were found to possess all the characters of theine. The amount of this body present in the kola nut is 2 per cent. No other acid, basic, or neutral body was found. The fresh nuts have a bitter taste, which the dried do not possess; and the former probably contain a bitter principle to which some of their activity must be ascribed. Starch is present to the extent of 42.5 per cent; gum, sugar, and an albumenoid substance (probably legumin) are also found, and likewise a small amount of an oil possessing a smell resembling that of myrrh, and a burning, persistent taste. Tannin is entirely wanting in the nuts. The composition of the nuts is shown in the following table:—

	In 100 parts.
Water, . . . . .	13.65
Cell wall and coloring matter, . . . . .	20.00
Starch, . . . . .	41.50
Volatile oil and fixed fat . . . . .	1.52
Albumenoid substance, . . . . .	6.33
Gum, sugar, and other organic matter, . . . . .	10.67
Ash, . . . . .	3.20
Theine, . . . . .	2.13

Dry kola is thus seen to somewhat resemble coffee, but differs in containing no tannin, but little fat, and much starch. When

made into a beverage, it is thick and mucilaginous ; but is tasteless, odorless, and flavorless, and is not improved by roasting.—*Lond. Chem. News*, Feb. 17, 1865.

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ON THE APPLICATION OF DIALYSIS IN DETERMINING  
THE NATURE OF THE CRYSTALLINE CONSTITUENTS OF  
PLANTS.

BY J. ATTFIELD, PH. D., F. C. S.

Director of the Laboratories of the Pharmaceutical Society of Great Britain.

(Read at the Bath Meeting of the British Pharmaceutical Conference, Sept., 1864.)

Some two years ago ("Pharmaceutical Journal" for March, 1862) I published the results of an examination of the saline efflorescences which are occasionally found on medicinal vegetable extracts. These crystalline out-growths were found to be chloride of potassium or nitrate of potash. The former salt had often been observed, but the latter had not been noticed although it is of common occurrence. From that examination, it seemed that nitrate of potash was a more frequent constituent of plants than had been suspected, and I then proposed the application of a method whereby the presence of it and of similar salts could be detected in the fresh plant. The suggestion was to dialyse expressed juices, concentrated decoctions or infusions of plants, and then to evaporate the diffusate to a small bulk, when it was to be expected that the nitrate of potash, or any other crystalline salt, would separate out in a solid and recognizable form.

Since that time I have submitted a few plant-juices, the first that came to hand, to the process, and have obtained results which justify me in recommending the method as one likely to be of great service in the study of vegetable physiology. Crystalline salts can be thus obtained which would inevitably be destroyed in burning a plant for its ash. The following are the details of the experiments:—

*Solanum tuberosum*.—A few pounds of potato tops were collected and at once crushed and pressed and the juice dialysed for twenty-four hours. On evaporating the diffusate and cooling, small prismatic crystals separated, having all the physical and chemical characteristics of nitrate of potash. Under the micro-

scope they were found to be six-sided and to twist a ray of plane polarized light, were not volatile, gave a violet tint to flame, and deflagrated on charcoal; the aqueous solution gave a yellow crystalline precipitate with bichloride of platinum, no odor on heating with caustic alkali, a black color with sulphate of iron and sulphuric acid, and yielded ammonia on heating with potash, zinc and iron. It was deemed desirable to apply all these tests in this and similar examinations, as a pound of vegetables seldom yielded more than a few grains of crystals, a quantity sometimes too small to purify crystallisation, and always too small to admit of the production of strongly marked analytical reactions. In the case of potato, however, I went to the trouble of operating upon thirty or forty pounds of the tops and thus obtained about the same number of grains of nitrate of potash, and the extra labor was rewarded, for the mother-liquor of the nitre, after standing aside two or three days, yielded a small crop of beautiful little crystals, of which I can at present say but little more than that they were not nitrate of potash. They were perfect little hexagons, not much longer than broad, with flat heads; I suspect them to be a magnesium salt. Besides these constituents, the juice of potato yielded cubes, hollow pyramids, and prisms of chloride of potassium, much ammonia and sugar, even immediately after expression, and other matters, the nature of which was not ascertained.

*Atropa Belladonna*.—The leaves and soft parts of the Deadly Nightshade also yielded nitrate of potash by the above process. But in addition some acicular crystals, single and in tufts, were obtained. These were carefully separated from the nitre crystals and were recrystallized. They were then found to be square prisms, either deliquescent nor efflorescent, and containing magnesium as the sole inorganic constituent. The nature of the organic matter associated with the magnesium could not be ascertained, apparently it was not any of the ordinary organic acids. The juice of Belladonna also contains ammonia, a matter which reduced copper salts as sugar does, and other bodies not examined.

*Pisum sativum*.—Several quarts of peas, in the shell, were similarly treated. The product was a thick syrup of light-brown



color, yielding no crystals even after the lapse of several weeks. The ash of a portion of it gave a pure potassium tint to flame, and its solution a slight chlorine reaction. Ammonia was also evolved on heating the diffusate with potash, but no nitric acid could be detected. Apparently, therefore, the fruit of the pea contains no nitrate of potash, and only a minute quantity of any inorganic crystalline salt. The chief organic crystalloid is obviously sugar.

*Lactuca sativa*.—Half-a-dozen large garden-lettuces were next submitted to the process. Here, again, the concentrated diffusate yielded nitrate of potash. The crystals, were, however, mixed with many perfect tetrahedra, but in quantity insufficient to admit of chemical analysis. The mother-liquor contained sugar and ammonia.

*Cucumis sativus*.—Several cucumbers were then operated on. They furnished a diffusate, of which the chief constituent was sulphate of lime, but it also gave reactions indicating sugar, and the juice, immediately after expression and again after dialysis, yielded ammonia on warming with dilute solution of potash.

*Brassica oleracea*.—The juice of three or four cabbages, treated in like manner, also gave a diffusate, from which much sulphate of lime separated on evaporation. It also yielded ammonia when heated with fixed alkali, but besides sulphate of lime no crystals were obtained from it.

*Datura Stramonium*.—This plant, the Bitter Thorn-apple, I found to contain so much nitrate of potash that a dried portion quite deflagrated on being burned in a muffle.

From these few experiments it is, I think, obvious that this application of Graham's beautiful process of dialysis promises to be of great service in investigating the nature of the crystalline constituents of plants. It may assist you in extending our knowledge of the natural state of combination of the alkalis and organic acids; it may demonstrate the presence of salts previously unknown, and may show that salts, hitherto only occasionally met with, are of common occurrence. Moreover, by showing the presence or absence or variation in amount of a given crystalline constituent, it will help us in ascertaining the influence which variations in climate and soil have upon vegetables, will doubtless aid in determining more ex-

actly the office of the various parts of plants, and, lastly, may throw light on the changes which go on at different periods of the life of a plant.—*London Pharm. Journal*.

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## ON TOBACCO.

BY FERDINAND F. MAYER, OF NEW YORK.

QUERY 11th.—Is nicotina the active principle in carefully dried green tobacco leaves? Do the seeds of tobacco contain the same alkaloid? and if so, does the proportion of nicotina in commercial tobacco justify the belief of Liebig (*Agricultural Chemistry*, Amer. ed., p. 184,) that it is an artificial product?

Numerous as have been the essays published both on the chemical and the therapeutical relations of *Nicotiana Tabacum* and its narcotic principle, they refer for the greater part to the leaf of the usual brown color and well-known irritating ammoniacal odor, which is the form officinal in all Pharmacopœias; for, though universally cultivated, the plant is never prepared specially for application in medicine like other narcotics, partly because of the commercial article being still more readily obtainable, but, in yet greater measure, because the fresh and the dried green leaves have very generally been considered, if not devoid, to be at least of very feeble developed medicinal virtues. Only those of another species, *N. rustica*, are occasionally used fresh as an external application, and are, or were formerly, officinal in some European Pharmacopœias.

There is so striking a difference in many of the outer properties of the officinal plant, in the green and the cured condition, as to offer in itself some grounds, for what was formerly universally and is even now very generally believed, that the volatile alkaloid on which the activity of brown tobacco is supposed to depend was not present as such in the living plant, but that it is a posthumous product formed entirely or partly during that incomplete fermentation which it undergoes in the hands of the cultivator, the "*bulking*" of tobacco. For, the fresh plant possesses none of the peculiar heavy odor of the other narcotics. Nor is the dried leaf much more pungent than a common herb. Its infusion, like the fresh juice, has an acid reaction, and contains no ammonia. Its color is pale green,

with here and there some brownish patches; but the taste is decidedly acrid, and certainly only differs from that of the commercial article by the absence of free ammonia. It also contains a large proportion of nicotina in combination.

This had been pointed out as early as 1809 by Vauquelin, in the report made by him with Robiquet and U. S. Consul Warden. It was again shown to be present by Posselt and Reimann, in 1831, in plants of several species grown near Heidelberg, and again in 1836 by Henry and Boutron-Charlard; and in 1831 A. Buchner, sr., prepared some nicotina from the seeds. Lastly, our excellent Procter, in the answer to very nearly the same questions as those at the head of this paper, read before the meeting of 1858, proved without doubt the presence of the alkaloid at least in the fresh leaves; and the authority on whose credit the origin by fermentation had been maintained, as quoted in the query, corrected the statement made there as early as 1844, upon the occasion of a paper on Tobacco-smoke by A. Melens, in a note to which (*Annalen der Chemie und Pharmacie*, vol. 49, p. 359) Liebig mentions that "at the Giessen Laboratory not inconsiderable quantities of the alkaloid had been obtained from the fresh plant."

With such evidence the presence of nicotina in the plant, through its various stages, may be accepted as satisfactorily proved. Yet Mr. Procter suggested that the matter, especially in regard to the seed, be again made the subject of research, and since this investigation has been undertaken by me, fresh interest has been imparted to it by the publication of a paper on the same subject in the *Vierteljahresschrift fur Pharmacie* of April last. The author of this essay found a volatile principle, which on the strength of its odor he assumes to be trimethylina (pseudo-propylamin,) said to have originated from a fermentable substance contained in the seed, and he believes that Buchner mistook a mixture of ammonia and trimethylina for nicotina.

In order to avoid, if possible, errors arising from reliance upon such deceptive characteristics as odor, and because in the examination of the plant at least two bases are met with possessing a pungent and somewhat similar odor, I have made use, besides the usual distinction resting on the percentages of pla-

tinum in the double salts of the volatile bases, of the following table founded on previous and new observations of Nessler, Winckler, Procter, myself and others.

*Principal Reactions of the Medicinal Volatile Bases.*

(w. = watery solution, s. = salts, or acid solutions.)

REAGENTS ADDED TO	AMMONIA.	TRIMETHYLINA.	ANILINA.	NICOTINA.	CONIA.	LOBELINA.
<i>Iodine in Iodide of Potassium.</i>	w. Decolorised. s. No change.	w. & s. Orange-colored precipitate.	Brown solution, afterwards a precipitate, or none.	w. and s. brownish red precipitate.	w. & s. Pale brownish-red precipitate.	w. and s. Brownish-red precipitate.
<i>Tannic Acid.</i>	w. No Precipitate. s. Precipitate of tannin if concentrated.	Neutral and alkaline solutions; white, curdy precipitate.	No precipitate.	Whitish precipitate, soluble in acids.	White precipitate, soluble in tannic and other acids.	White precipitate, soluble in tannin and ammonia.
<i>Chloride of Mercury.</i>	w. White precipitate.	w. White precipitate.	No precipitate.	w. White precipitate.	w. White precipitate.	w. No precipitate.
<i>Iodo-hydrargyrate of Potassium.</i>	s. No precipitate; with of pale yellow caustic KO orange to brown precipitate. w. White to yellow precipitate, soluble in excess.	s. A loose mass of pale yellow crystals, very soluble in excess of iodide of potassium. & caustic KO; decomposed by shaking with water. w. Precipitate which re-dissolves in excess.	w. Solution; white precipitate, soluble in excess and in KI, re-produced by KO, but re-dissolved by excess of the same.	w. and s. Yellowish precipitate, somewhat soluble in excess of reagent, and readily soluble in caustic KO.	w. & s. Same as nicotina.	w. and s. Pale yellow precipitate, little soluble in excess of reagent or of caustic KO.
<i>Acetate of Lead.*</i>	.....	.....	.....	.....	.....	.....
<i>Nitrate of Silver</i>	w. Brownish-black.	w. Grayish, soluble in nitric acid.	No precipitate.	w. At first no precipitate, but at turning brownish-black on heating.	w. White precipitate, turning brownish, soluble in ammonia, at first also in nitric acid.	w. White precipitate, soluble in ammonia and nitric acid.
<i>Chloride of Gold</i>	w. Reddish-yellow precipitate.	w. Grayish-yellow, insoluble in hydrochloric acid.	w. No precipitate.	w. Yellowish, curdy, insoluble in HCl.	w. Whitish, insoluble in HCl.	w. Pale yellow, insoluble in HCl.
<i>Chloride of Platinum†.</i>	.....	.....	.....	.....	.....	.....
<i>Density and Solubility.</i>	Very soluble; mixes with water.	Very soluble; mixes.	Scarcely soluble; floats.	Little soluble; sinks.	Little soluble; floats.	Little soluble; floats.

*Course of Proceeding.*—The volatile alkaline substance having been obtained in form of a concentrated solution in water, and

\* In the watery solution, except of *anilina*, a white precipitate.

† Distinct precipitate only from *nicotina*, which dissolves on heating.



in part as solution in hydrochloric acid, a drop of a solution of iodide of potassium saturated with iodide of mercury is added to part of the acidulated solution. Either,

I. *It produces no precipitate.*—Absence of trimethylina, nicotina, lobelina, conia. To a portion of the unchanged solution add caustic potassa in slight excess, which causes a precipitate. It is

Whitish and pulverulent: *anilina*.

Reddish to brown and flocculent; *ammonia*.

II. *A precipitate is produced.*—Add excess of the solution of mercury.

1. The precipitate re-dissolves very readily: *trimethylina*.
2. The precipitate is scarcely soluble in excess of mercury, but readily, while fresh, in caustic potassa: *nicotina*, *conia*. Apply the specific tests.
3. The precipitate is scarcely soluble in either: *lobelina*.

NOTE.—*Ammonia*.—Its reactions, as for instance that with cobalt, are rendered indistinct by the presence of carbonic acid.

Commercial *trimethylina* (the medicinal propylamin) is probably never free from ammonia, which is readily ascertained in an acid solution by the test with iodohydrargyrate and caustic potassa. It should be perfectly colorless and clear, of a faint odor of ergot rather than of herring, and must burn like alcohol.

*Conia*, when quite pure, is colorless, and has a peculiarly sweet but rancid or somewhat musty odor. *Lobelina* resembles it in many respects; has an herbaceous odor, recalling that of prussic acid.

The alkaloids tested were freshly prepared for the experiments by the method described further on for nicotina.

#### EXAMINATION OF TOBACCO.

The material engaged for the experiments with fresh tobacco, —a dozen plants in full growth, collected after “topping” the buds,—unfortunately, by some delay in delivering, reached me in so damaged a condition as to reduce very considerably the extent of my investigations.

Of the uninjured leaves, with their petioles and ribs, 25 troy ounces were spread out to dry until their weight had been reduced to 1625 grains,—a loss of 86.5 p. c., though they were not yet perfectly air-dry.

Of this weight, only 245 grains had remained green through-

out, or showed scarcely any decolorization. The remainder had become more or less brown, on the upper surface principally, scarcely on the lower. They possessed a simple herbaceous odor, no pungency like that of ammonia, or commercial leaf, but a decidedly acrid taste.

One hundred and seventy-one grains of the green leaves were exhausted with boiling alcohol,—dilute alcohol acidulated with hydrochloric acid,—and the alcohol removed from the tincture by distillation. The residue indicated, when tested with tenth normal solution of iodohydrargyrate of potassium, (one cubic centimetre = 0.00405 of a gramme = 0.0625 of a grain of nicotina,) 2.345 grains of the alkaloid in 171 grains. 1.36 p. c. of the dry leaf = 0.1836 p. c. in the fresh.

Six hundred and sixty grains of the leaves which had become somewhat tainted were treated in precisely the same manner. They indicated, within a mere fraction of 9.37 grains of alkaloid, = 1.42 per cent. in the dry, = 0.1917 per cent. in the fresh state.

Of the fresh leaves, the juice of which was of a very decided acid reaction, 28.5 troyounces had, at the same time been placed in digestion at a moderate temperature for several days, with water acidulated with sulphuric acid. The 3700 cc. of liquor, resulting, contained, according to assay, 28.87 grains of nicotina, equal to 0.21 per cent. in the fresh state.

Ten troyounces of the same were macerated in the same manner; the resulting liquor, however, evaporated in a porcelain dish to the consistence of soft extract, and after redissolving tested with iodohydrargyrate; this indicated 4.75 grains; only 0.1 per cent were still present.

Commercial tobacco, known as Connecticut seed-leaf, and reported to be of the same variety and neighborhood as the fresh plants under examination, presented the usual properties of good tobacco. Its simple watery infusion was decidedly alkaline. Hydrogen gas and still more air at a slightly elevated temperature passed over the tobacco contained in a long tube, carried off very noticeable quantities of nicotina and ammonia. On distilling it with water, the vapors carried over nicotina, ammonia and its carbonate, and it was observed that the whole of the nicotina contained in a watery infusion could be evolved

by boiling, or distilling it with a large excess of caustic ammonia.

As the result of several assays with two troyounces at each time, I obtained as mean proportion of nicotina 13.25 grains, equal to 1.36 per cent. of the leaf, precisely the percentage in the first assay as given above.

Tobacco seed of the same variety possesses scarcely any acidity, except what arises from rancidity of the oil. The latter is at times extracted as from other seeds, and employed for household use. Decoction with acidulated water was found to be the best mode for their extraction.

Three troyounces, thoroughly bruised, were boiled for several hours with water and a little sulphuric acid. The filtered liquor indicated, with iodohydrargyrate, 6.46 grains of nicotina = 0.45 per cent. of the seed.

The leafstalks and ribs of the commercial leaf, and the liber of the green stalk, yielded noticeable quantities of the alkaloid, but their percentage was not determined.

For the purpose of identifying the alkaloid, or bases carried down by iodide of mercury from acidulated solutions in these several instances, the precipitates were washed with water—(since the test solution of iodohydrargyrate, besides containing a large excess of iodide of potassium, is too dilute to allow any trimethylina to be precipitated, no attention needed to be paid to any possible decomposition of the precipitate); it was then rubbed smooth in a mortar with a concentrated solution of protochloride of tin, to which were afterwards added small pieces of caustic potassa, so as to form an alkaline solution of protoxyd of tin. The result in this as well as in the case of all other bases, when their compounds with mercury are similarly treated, is that the mercury is reduced to the metallic state, its iodine or chlorine combining with the tin; the hydriodate of the base, then disengaged, is acted on by the excess of caustic alkali, and the base, when the mixture is now agitated with ether, is at once taken up in an almost pure condition.

After distilling off the ether, the residue is dissolved in dilute hydrochloric or oxalic acid, filtered, again shaken with alkali and ether or chloroform, which will then give a pure solution of the

base, provided no lengthy evaporation has been made use of, in preparing liquors for precipitation with mercury.

The ethereal solution obtained in this manner from precipitates of nicotina at first leaves the alkaloid as a pale, yellowish, oily liquid, surrounded by a greenish brown soft resin or impure wax, which, next to ammonia, is the cause of the pungent odor of tobacco. To a certain extent it is a product of the oxidation of the alkaloid, but when repeatedly dissolved in alcohol it is odorless and tasteless, and contains no nitrogen.

Pure nicotina obtained from the second or third solution in ether is colorless, has no odor at first, but acquires the pungency and odor of tobacco after some hours' exposure to the air, or on being heated. It agrees in most respects with the description given by Henry and Boutron-Charlard. Half a drop of it instantly killed a full-grown pigeon.

The liquids from which the precipitate of nicotina with mercury had been obtained, and which contained an excess of iodide, were, after filtering, rendered alkaline by the addition of caustic potassa. This causes a decided precipitate only in the case of commercial tobacco; the solutions from the dried leaves, in both the above experiments, gave a faint cloudiness. The filtrate from the seeds did not even show a trace of what would have indicated the presence of ammonia.

The precipitate produced in the first case was decomposed by alkali and protoxyd of tin, and then distilled; the distillate was converted into a platinum salt, which had all the properties of that of ammonia.

Having become satisfied, by my preliminary examination, that no stronger alkali than ammonia was required to expel nicotina as well as trimethylina, parts of the solutions to which no mercury had been added were severally distilled with caustic ammonia.

In the case of the acid infusion of fresh tobacco, no bases besides ammonia (from the retort) and nicotina were to be found in the gases and the liquids which came over and were received in hydrochloric acid. Evaporated to dryness, and tested for trimethylina, no traces of it could be discovered by the reactions described above, nor any particular resemblance in the odor; nor could any inflammable gas be extracted from the residual chlorides on heating with caustic potassa or baryta.



With an infusion of commercial tobacco, a great part of the nicotina comes over without the addition of an alkali, and nearly the whole quantity is obtained by adding a considerable excess of ammonia. This form is likewise free from trimethylina.

There is no perceptible difference in this respect between a decoction of the seed, and one of the fresh plant. The distillate contains only ammonia [intentionally] and nicotina.

From the watery distillate of ordinary tobacco, which had a milky appearance, but gave no deposit, and contained both ammonia and nicotina in solution, after acidulating with sulphuric acid, ether extracted a small quantity of a substance, which I believe to be identical with the soft resin described before.

Though the experiments delineated so far are evidently yet incomplete, they still serve to answer the question proposed as completely as was possible at this season of the year.

The conclusions which I beg to submit are—

1. That nicotina is the active principal in all parts of the plant before and after curing.
2. That there is in all probability no increase, but rather a loss of nicotina during the drying and curing, partly or wholly caused by volatilization ; and
3. That the plant or its parts contain no trimethylina, nor any ammonia while fresh. —*Proc. Amer. Pharm. Asso.* 1865.

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#### ON THE INVISIBLE RADIATION OF THE ELECTRIC LIGHT.

BY JOHN TYNDALL, F. R. S.

Pending the preparation of my complete memoir, which may occupy me for some time to come, I would ask permission of the Royal Society to lay before the fellows a brief and partial summary of the results of my experiments on the invisible radiation of the electric light.

The distribution of heat in the spectrum of the electric light was examined by means of the linear thermo-electric pile, applied to the solar spectrum by Melloni, Franz, Müller, and others. The electric spectrum was formed by lenses and prisms of pure rock-salt, its width being equal to the length of the row of elements forming the pile. The latter, standing at right angles to the length of the spectrum, was caused to pass through

its various colors in succession, and to search the spaces beyond the region of color in both directions.

As in the case of the solar spectrum, the heat was found to augment from the violet to the red, while the maximum heating effect was observed beyond the red, and at a distance from the red, in one direction, equal to that of the green of the spectrum in the other.

The augmentation of temperature beyond the red in the case of the electric light is sudden and enormous. Plotting from a datum line the thermal intensity of the various portions of the spectrum, the ordinates suddenly increase in length beyond the red, reach a maximum, and then fall somewhat more suddenly on the other side. When the ends of the ordinates are united, the curve beyond the red rises in a steep and massive peak, which quite dwarfs the luminous portion of the spectrum.

The comparative height and steepness of this peak are much greater than those obtained by Professor Müller for the solar spectrum. Aqueous vapor acts powerfully upon the invisible rays, and, doubtless, the action of this substance in our atmosphere has toned down the eminence beyond the red in Professor Müller's diagram. A solar spectrum, produced beyond the limits of the atmosphere, would probably exhibit as steep a peak as that of the electric light.

In the experiments now to be referred to, the rays from the electric light were converged by a small concave mirror. The glass mirror silvered at the back, which usually accompanies the camera of Duboseq's electric lamp, was one of the first employed. It was brought so near the electric light as to cast an image of the coal-points five or six inches in advance of the light. A solution of iodine in bisulphide of carbon, contained in a rock-salt cell, was then placed in front of the lamp: the light was thereby cut off, but the focus of dark rays remained, and various effects of combustion and incandescence were obtained at the focus. A mirror four inches in diameter, and silvered in front, will enable an experimenter to obtain most, if not all the results now to be mentioned. I also employ a mirror eight inches in diameter, and having a focal length of eight inches, with excellent effect.

It is not necessary to enclose the opaque solution in a rock

salt cell. The vessel intended for a solution of alum, which usually accompanies the lamp of Duboscq, and the sides of which are of glass, answers admirably. It is not, however, quite deep enough for the several tests to which I have subjected it, and in crucial experiments I employ a deeper vessel with rock-salt sides.

With the eight-inch mirror just referred to behind the electric light, the opaque solution in front, and the focus of invisible rays about six inches distant from the electric light, the following effects have been obtained :

1. Wood, painted black, when brought into the dark focus, emits copious volumes of smoke, and is soon kindled at the two spots on which the images of the two coal-points fall.

2. A piece of brown paper placed near the focus soon shows a burning surface, which spreads over a considerable space, the paper finally bursting into flame.

3. Black paper brought into the focus is immediately inflamed.

4. The wood of a hat-box similarly placed is rapidly burnt through, and usually bursts into flame.

5. The end of a cigar, placed at the dark focus, is instantly ignited.

6. Disks of charred paper, placed in the focus, are raised to brilliant incandescence, surfaces of considerable extent being brought to a vivid glow. Charcoal is also ignited.

7. A piece of charcoal, suspended in a receiver of oxygen, is ignited in the dark focus and caused to burn brilliantly, the rays after crossing the glass of the receiver being still sufficiently powerful to heat the coal up to incandescence.

8. A mixture of oxygen and hydrogen is exploded in the dark focus by the ignition of its envelope.

9. A piece of zinc-foil, blackened on one side to diminish reflection, is pierced and inflamed. By gradually drawing the strip, once inflamed, across the focus, it may be kept blazing for a considerable length of time. This is a particularly beautiful experiment.

10. Magnesium wire, presented suitably to the focus, burns with its intensely luminous flame.

In all these cases the effect was due, in part, to chemical action ; this, however, may be excluded.

11. A plate of any refractory metal, sufficiently thin, and with its reflective power suitably diminished, is raised to incandescence in the dark focus. Gold, silver, copper, aluminium, and platinum have been thus rendered incandescent.

12. Platinised platinum shows the effect best ; in a thin leaf it may be rendered white-hot, and on it is depicted an incandescent image of the coal-points. When the points are drawn apart, or caused to approach each other, their incandescent images conform to their motion.

The assemblage of phenomena here described, and others to be referred to in my complete memoirs, may, I think, be properly expressed by the term "calorescence." This word involves no hypothesis, and it harmonises well with the term fluorescence, now universally employed with reference to the more refrangible end of the spectrum.\*—*Chem. News*, London, Feb. 10, 1865.

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#### ON THE AQUEOUS EXTRACT OF JALAP.

BY ALFRED B. TAYLOR.

"Does the aqueous extract prepared from Jalap that has been previously exhausted by alcohol, possess any medicinal properties, or does the alcoholic extract of jalap fully represent its virtues?"

A superior quality of jalap was selected for this experiment. It was reduced to fine powder, and having been exhausted with

\* On December 5, last, I tried the passage of the rays from the electric lamp through a great number of different colored glasses. Incandescence was obtained through almost all of them ; and in one instance, the radiation passing through a blue glass, the thermograph of the coal points was of a pink color. A thick black glass, obtained from Mr. Ludd, when held in front of the lamp, was found to be not perfectly opaque, still the platinum could not be raised to incandescence at all when placed in the focus. Being called away from the Royal Institution early in the afternoon, I gave directions to my assistant, Mr. Barrett, to continue the experiments. He informs me that on placing in the path of the rays a combination of two thin plates of black glass, one transmitting a whitish-green and the other a deep red, the light was entirely intercepted and feeble, though distinct incandescence was obtained at the focus. With radiation through the solution of iodine, the thermograph on this day rose to a white heat.



alcohol, was treated with water; the infusion was evaporated carefully, and the resulting extract was subjected to experiment.

Thirty grains were taken by myself at 10 o'clock, A. M. At 12 o'clock, M., no action having been produced, the dose of thirty grains was repeated. At 1 o'clock the dose of thirty grains was again taken. This dose was repeated every hour until eight doses were taken; it was then discontinued, no apparent effect having been produced, and the conclusion having been arrived at, that such an extract possessed no remedial powers. It has been stated that this extract is diuretic in its properties, but I have not been able to discover diuretic, or indeed any other effects from this dose of 240 grains.

From this experiment it would appear that "Extractum Jalapæ," of the U. S. Pharmacopœia, is an unscientific preparation, being only about one-fourth as strong as "Resina Jalapæ;" the comparative yield of aqueous extract and alcoholic extract being about three of the former to one of the latter.—*Proc. of the Amer. Pharm. Asso.* 1864.

Philadelphia, September, 1864.

## ON PYROXYLIN.

BY MM. PELOUZE AND MAUREY.

(Continued from page 40, January number)

*Composition of Pyroxylin.*—In 1847 we determined the composition of pyroxylin, and represented it by the following formula— $C_{24}H_{17}O_{17}.5NO_5$ .

We must first find out whether we operated on a product different to Lenk's pyroxylin, and if the two are chemically identical, whether this formula is correct.

We have conducted these researches with the greatest possible care, and believe we have surmounted the difficulties of the combustion of pyroxylin. We found the pyroxylin of Hirtenberg and Bouchet chemically identical, and found for them a formula differing from the previous one by only one equivalent of water.

This formula is  $C_{24}H_{18}O_{18}.5NO_5$ .

It is so like the previous formula— $C_{24}H_{17}O_{17}.5NO_5$ —that analysis alone would not be sufficient to justify the alteration

without being supported by the amount of the yield. In fact, the new formula supposes a yield of 177.78 of pyroxylin for 100 of cotton, while the old formula corresponds to a yield of only 175. The direct experiments described above gave the figure 178.

All the gun-cottons we analysed were previously washed in a mixture of alcohol and ether, to remove some millièmes of fatty and soluble matters, then dried for several hours in a stove at a temperature between 40 and 50°.

All were of the composition above described, and gave the following figures:—

Carbon	.	.	.	.	.	.	25.00
Hydrogen	.	.	.	.	.	.	3.13
Oxygen	.	.	.	.	.	.	59.72
Nitrogen	.	.	.	.	.	.	12.15
							<hr/>
							100.00

*The Action of Heat on Pyroxylin.*—General Lenk ascribes the unsatisfactory results obtained in France by the Commission of 1846 to the fact that not sufficient attention was paid to the manner in which the pyroxylin was prepared, and to operating upon an insufficiently defined nitred product. By taking advantage of conditions most favorable to nitrogenisation, he believes he has obtained a pyroxylin very difficult to decompose.

We will not discuss the theoretical value of this assertion, which does not seem to us to be very great. It is, on the contrary, more probable that gun-cotton would decompose more readily the less like cellulose, and, consequently, the more nitred it became. However this may be, General Lenk says that pyroxylin made by his process will not explode below 136° C.

We have made this important point the subject of numerous experiments.

These experiments were first made with an experimental matrass, open or closed, and plunged into a bath of boiling water.

All the samples heated in this way to 100° were sooner or later decomposed, and in a few minutes a disengagement of nitrous vapors took place.

The decomposition takes place in different ways, and can-

not be reproduced at will. Four methods of decomposition at  $100^{\circ}$ , having the common characteristic of the disengagement of nitrous vapors may be given :—

1. The pyroxylin detonates violently.
2. It decomposes without detonating, leaving a white, pulverulent, acid residue, partially soluble in water, containing no nitrogen, and forming about half the weight of the pyroxylin.
3. It leaves a yellow, amorphous, inexplorable residue, partially soluble in water, and reducing, like glucose, the double tartrate of copper and potash.
4. It gives a small residue (only 8 to 10 per cent. of its weight), and a black matter, in appearance like charcoal. In this case the matrass is entirely covered with a yellow powder, which dissolves in alkali with considerable disengagement of ammonia (this matter is apparently ultimate of ammonia). From this solution acids precipitate a dirty yellow body, also soluble in alkalies. The charcoal-like residue disengages ammonia under the action of potash. This production of ammonia by the simple action of heat from a matter formed of nitric acid and cellulose is very remarkable.

Other experiments made on various pyroxylin at  $90^{\circ}$  and then at  $80^{\circ}$  gave exactly the same results, except that decomposition took place after several hours instead of a few minutes.

At  $60^{\circ}$ , and even at  $55^{\circ}$ , pyroxylin is still decomposed. After a few days the matrass becomes full of dense reddish vapors, and the same non-nitrogenised pulverulent residue of which we have already spoken is obtained. No combustion was observed in these latter experiments.

We moreover produced detonation by putting about one gramme of pyroxylin into one of Gay-Lussac's copper stoves containing oil at only  $47^{\circ}$ . The pyroxylin thus decomposed was from a specimen prepared by forty-eight hours' immersion, and washing by Lenk's process.

These experiments plainly show that, contrary to General Lenk's assertion, his pyroxylin does not offer more resistance to the action of heat than that of Bouchet, the Austrian silicated pyroxylin having under all conditions behaved itself in the same manner as the others.

From its decomposing at about  $50^{\circ}$ , it may be asked whether pyroxylin is not liable to decompose even at the ordinary temperature. Is it, for instance, likely to detonate spontaneously when kept in large masses in magazines? Several chemists have given examples of the decomposition of pyroxylin at the ordinary temperature. They have generally mentioned as products of this decomposition nitrous vapors and several oxidised bodies like formic, oxalic, and acetic acids, and residues of gummy or saccharine substances, and have endeavored to ascribe these instances of the alteration of pyroxylin to imperfect washing.

We will in the first place remark that it is easy to wash small quantities of materials, and that as the destructive action of sulphuric acid on pyroxylin is perfectly established, it is evident that the greatest care should be taken to eliminate every trace of it, and that consequently the most careful washing is necessary.

Without entering into the details of the known cases of the decomposition of pyroxylin at the ordinary temperature, we will describe the decomposition we observed in some specimens made in 1847, which had been washed with especial care either in pure or alkaline water.

Of twenty-eight samples placed in small stopped flasks, and a few grammes in weight, sixteen underwent alteration of some kind.

We took at hazard one of the altered specimens, and examined it. It was originally composed of six grammes of pyroxylin which had been washed in potash water and left since March 17, 1850, or fourteen years, in a flask imperfectly stopped. It had left a residue representing 79 per cent. of a dark yellow color, and considerable amount of acid, but no sulphuric acid. This residue dissolved completely in water, and like glucose reduced tartrate of copper and potash. Its boiling solution gave a decided odor of vinegar, and, what was very remarkable, disengaged ammonia under the action of potash.

There are, then, under the ordinary atmospheric conditions, incontestable instances of the spontaneous alteration of pyroxylin, which, moreover, had been washed in alkaline water.

Now we have shown that pyroxylin is sure to decompose with



heat, that in some cases it detonates, and in others apparently identical it is destroyed without combustion. Why should it not be the same at a low temperature? Why should we not add to the instances of simple decomposition those of detonation? The analogy is so evident that we need not have recourse to the supposition of imperfect washing to explain the combustion of pyroxylin.

The Hirtenberg pyroxylin itself exploded in the magazine at Simmering, and in the investigation made July 31, 1862, it was merely decided that the accident was due to spontaneous combustion. It has also been attributed to the ordinary powder also contained in the magazine, but this supposition is inadmissible, as for several centuries there has been no known instance of spontaneous combustion of gunpowder. We must not, of course, as was done in an Austrian paper, confound accidents during manufacture, carelessness of workmen, or faulty mechanism, with the explosions produced by no other cause than the reactions among the elements of the compound.

*Comparison of Lenk's Pyroxylin with those of Bouchet relative to their Propulsive and Blasting Qualities.*—It remains for us to give the results of the experiments made with Navet's pendulum to compare the propelling powers of these two kinds of gun-cotton. Twenty-five charges were fired with Lenk's pyroxylin, fifteen with those of Bouchet, three grammes for each charge, and round balls weighing each 25 gr. 50.

Taking first the medium velocity of the balls, and then the greatest and the least, we have—

	Gun-cotton.	
	Hirtenberg. m.	Bouchet. m.
Medium velocity, . . .	385·36	394·32
Greatest " . . .	441·53	485·94
Least " . . .	357·63	357·63

Differences much greater than those presented by the above figures are sometimes found in firing from the same specimen. For instance, the pyroxylin brought from Austria by General Lenk was fired twice, giving—

	m.
On February 17, . . . . .	374·40
" March 8, . . . . .	408·40

From these results we may conclude that both kinds have the same ballistic force.

In these experiments the gun was filled to the height of 0.05m. It was proposed to ram it harder, reducing the height to 0.03m; but the first charge fired by this method, and with three grammes of General Lenk's pyroxylin, burst the gun barrel.

This accident has also happened in firing charges of the Bouchet pyroxylin, showing the resemblance between the explosive property of the French and Austrian pyroxyles.

We will not here describe all the attempts made by the Commission of 1846 to obviate the inconvenience arising from the too rapid combustion of pyroxylin, but will confine ourselves to those made for the same purpose by General Lenk.

He first unsuccessfully tried compressed cartridges, then some which he called long cartridges, formed of paper cylinders covered with gun-cotton yarn. With these an Austrian 12-pounder charged with about 481 grammes of gun-cotton gave a velocity of 427 metres.

But this speed, though the greatest attained by the experiments in question, is less than that obtained in France with a similar gun, and with a charge of 2 kilogrammes of ordinary powder, which was about 480 metres, and which the Commission of 1846 endeavored to attain by using 667 grammes of pyroxylin.

Now, it has not been proved that Lenk's cartridges would not injure pieces of ordnance were the quantity of pyroxylin increased so as to obtain the same speed as in France.

The author of one of the Austrian reports recognizes the fact that the results obtained are unsatisfactory, and that the mechanical means employed to prevent the development of the injurious properties of the pyroxylin neutralise part of its propelling power; and arrives at the conclusion that the problem will be resolved only when firearms are made in which the injurious effect may be disregarded. This is also our opinion; but how to overcome the objection of the spontaneous explosions, which to us is the first consideration?

The result of our researches is, that though the composition, method of production, and chemical properties of pyroxylin may

be better known, the principal point—its use for firearms—remains in nearly the same state in which it was left by the French Commission of 1846.

There is nothing to lead us to suppose it possible, in the present state of our knowledge, to prevent the spontaneous explosion of pyroxylin, or to get rid of its injurious properties.—*Chem. News*, Oct. 29, 1864, from *Comptes Rendus*, lix., 363, 64.

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#### BARON LIEBIG'S SOUP FOR CHILDREN.

With that remarkable estimation of the greatness of small things which is one of the most valuable of his many high intellectual qualities, and with a tender appreciation of the importance of small people, Baron Liebig devotes a special article in an English scientific periodical to the description of a new article of diet which he conceives to be the most fitting substitute for the natural nutriment for those children who are by circumstances robbed of their mother's milk. It is well known that cow's milk does not adequately represent the milk of a healthy woman, and when wheaten flour is added, as it commonly is, Liebig points out that, although starch be not unfitting for the nourishment of the infant, the change of it into sugar in the stomach during digestion imposes an unnecessary labor on the organization, which will be spared it if the starch be beforehand transformed into the soluble forms of sugar and dextrine. This he effects by adding to the wheaten flour a certain quantity of malt. As wheaten flour and malt flour contain less alkali than woman's milk, he supplies this when preparing the soup. This "soup" may be shortly prepared as follows: "Half an ounce of wheaten flour, and an equal quantity of malt flour, seven grains and a quarter of bicarbonate of potash, and one ounce of water, are to be well mixed; five ounces of cow's milk are then to be added, and the whole put on a gentle fire; when the mixture begins to thicken it is removed from the fire, stirred during five minutes, heated and stirred again till it becomes quite fluid, and finally made to boil. After the separation of the bran by a sieve, it is ready for use. By boiling it for a few minutes it loses all taste of the flour."

The immediate inducement for his making the soup was that

one of his grand-children could not be suckled by its mother, and that another required, besides his mother's milk, a more concentrated food. In both cases, as well as in other families where it had been introduced, the soup proved an excellent food, the children thrived perfectly well, and many a petty suffering disappeared after some weeks' use of the soup. He often takes it prepared with ten parts of milk and two parts of malt flour, with tea, for his breakfast. He adds that "Dr. Von Pfeufer, the most renowned physician in Munich, has induced the apothecaries of the town to keep for sale a mixture of half an ounce of malt flour and seven grains and a quarter of bicarbonate of potash, milk and wheat flour being supposed to be in every house. The malt flour ought to be always freshly made from the malt.—*Boston Medical and Surgical Journal*, March 16, 1865, from *The Lancet*, Jan. 7.

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## THE PREPARATION OF LITMUS.

BY M. DE LUYNES.

Two different products are included under the name of litmus, that in sheets and that in cakes. The latter is used as a reagent; with water or alcohol it gives a violet blue liquid, which becomes light red by contact with acids.

The process for preparing litmus consists in coloring orchil lichens under the influence of air and ammonia, in the presence of a large excess of alkaline carbonate. M. Gelis has tested the exactness of these indications, and has obtained very excellent litmus by treating orchil lichens, mixed with half their weight of carbonate of potash, by ammonia. But whatever the mode of preparation, either carbonate or sulphate of lime is added to the litmus paste, to dry and preserve the coloring matter, which constitutes but a very small fraction of the total weight of the cakes.

M. Dumas has shown that when orceine becomes colored under the influence of air and ammonia, it produces only one coloring matter, which is orceine. By modifying the circumstances under which orceine becomes colored, M. de Luynes has succeeded in preparing a product identical in its properties with litmus. As litmus has not yet been obtained by means of orceine, and as some chemists seem to doubt whether it can be so derived, M.



de Luynes has adopted the following process :—He mixed orceine with twenty-five times its weight of crystallized carbonate of soda, and five times its weight of water, with the addition of a weight of liquid ammonia, not more than equal that of the orceine, in imperfectly stopped matrasses. He heated the whole to between  $60^{\circ}$  and  $80^{\circ}$  for four or five hours, taking care to stir it from time to time. The dark violet-blue liquid he diluted with water and saturated with a slight excess of hydrochloric acid, which precipitated the coloring matter ; this latter washed and dried is pure litmus.

Litmus thus prepared is in the form of small irregular masses with the variegated metallic reflections common to most coloring matters. It is very slightly soluble in cold water, to which it imparts a wine-colored tinge, which by contact with acid turns to the color of onion skin, and with alkalis to violet blue. In alcohol, also, which it colors yellow. Concentrated sulphuric acid dissolves it, taking a very rich violet-blue color, which becomes light red on the addition of a large quantity of water.

The alcoholic solution, diluted with water, constitutes a reagent extremely sensitive to the slightest trace of alkaline substance. By adding a little potash to it, a blue liquid is obtained, which, in contact with acids, sulphuretted hydrogen, and other compounds, behaves in the same way as ordinary litmus solution.

Dry litmus, heated in tube, gives an abundant deposit of carbon, and disengages ammonia.

The preparation of ordinary litmus solution requires some time ; it does not keep long without altering, and to render it sensitive the excess of alkali it contains must be saturated. M. de Luynes' product keeps without altering in the dry state : the cold solution can be very rapidly prepared, and may be immediately employed in any determinations by standard solutions.—*Lond. Chem. News, March 31, 1865.*

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#### ON COBALTIC ACID.

The existence of cobaltic acid, which has long been suspected, seems to be proved by M. Winkler's experiment. According to him, by boiling different cobalt products, but more especially the

metal in powder, with a concentrated solution of caustic potash, an intensely blue liquid is obtained, containing cobaltate of potash.

The proper proportions seem to be one part of metal in a spongy state (produced by the reduction of protoxide by means of hydrogen or starch,) one part of caustic potash, and three of water; the boiling is continued until the dark blue color is produced, after which the mixture is filtered through asbestos.

Cobaltate of potash is not very stable; it cannot be evaporated to dryness; its solution decomposes spontaneously, and the more rapidly the more it is diluted; acids precipitate from it hydrated protoxide with disengagement of oxygen, a part of which dissolves in the water, forming binoxide of hydrogen, hydrochloric acid is decomposed, and its chlorine set at liberty. Sulphurous acid is transformed into sulphuric acid, which combines with the protoxide of cobalt. By estimating the cobalt and determining the quantity of sulphuric acid formed in a given volume of cobaltate of potash, the author has ascertained the composition of cobaltic acid; he represented it in his first paper by  $\text{CoO}_6$ , and afterwards by  $\text{CoO}_3$ . It would be interesting to compare this compound with that obtained by M. Schwartzenberg by fusing oxide of cobalt with potash in contact with the air.—*Lond. Chem. News, March 31, 1865.*

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#### PREPARATION OF SULPHATE OF AMMONIA.

MM. Margueritte, Lalouet, de Sourdeval, and Worms, of Romilly, have, with the coöperation of the able director of the Compagnie Richer, established at Bondy a large factory of sulphate of ammonia, producing daily from 7000 to 8000 kilogs. The raw material is the liquor of the Bondy basins, which is merely the liquor of cesspools left to stand for a time sufficient to exhaust the fermentation, and transform the urea into carbonate of ammonia, the solution of which is decanted. Ammonia exists in these liquids in the state of sesquicarbonate or bicarbonate.

The distilled ammonical liquid, which is perfectly limpid, marks

18° on Baume's areometer, and even more than that, for the solid carbonate may be obtained.

Ammoniacal sulphate and hydrochlorate are prepared by the direct action of the ammoniacal liquid on sulphuric acid at 55°, or hydrochloric acid at 22°. The evaporated salts are sublimed in the ordinary manner on hearths heated by the waste heat.

The manufacture of ammoniacal salts will before long absorb all the liquids daily carried to Bondy; and if, as it is to be hoped, some means is found to accelerate the production of powdered night-soil, the manufactory of Bondy, which is very favorably situated, will become no greater nuisance than others of its kind.

M. Margueritte is now engaged on a new improvement in the manufacture of sulphate of ammonia, in which he substitutes gypsum for sulphuric acid.

Carbonate of ammonia, by double decomposition, produces carbonate of lime and sulphate of ammonia. This reaction is well known, but what is new is that this reaction is singularly facilitated by the addition of a small quantity of chloride of calcium.—*Lond. Chem. News*, March 31, 1865.

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### Minutes of the Philadelphia College of Pharmacy.

The Forty-fourth Annual Meeting of the Philadelphia College of Pharmacy was held at the College Hall, on Monday evening, March 27th, 1865.

The President, Charles Ellis, in the Chair. Eighteen members present. The Minutes of the last Stated Meeting were read and adopted.

The Minutes of the Board of Trustees were read by A. B. Taylor, Secretary of the Board. They inform that there has been added to the College Library, one hundred and fifty-five volumes during the past year, of which seventy six volumes were acquired by purchase and seventy-nine by donation.

The Matriculants in the School of Pharmacy for the session 1864—65 numbered one hundred and six.

At the late Commencement of the College, the degree of Graduate in Pharmacy was conferred on twenty-nine graduates, as follows :

Blair, Andrew,	Philadelphia, Pa.,	<i>Psidium Pyriferum.</i>
Blomer, Augustus P.,	" "	<i>Eupatorium Perfoliatum.</i>
Clark, Thomas C.,	" "	{ <i>Trials and Difficulties of Professional Life.</i>
Cornell, Edward A.,	Williamsport, "	<i>Polygonum Punctatum.</i>
Ditman, Andrew J.,	Philadelphia, "	<i>Starch, Gluten and Fecula.</i>
Gross, George A.,	Harrisburg, "	{ <i>Several Formulæ of the U. S. Pharmacopæia.</i>
Harry, J. W.,	Conshohocken, "	<i>Sanguinaria Canadensis.</i>
Heller, Marx. M.,	Cleveland, Ohio,	<i>Cypripedium Pubescens.</i>
Hillary, John F.,	Philadelphia, Pa.,	{ <i>Causes and Effects of Health and Diseases.</i>
Huber, Milton,	Norristown, "	<i>Phytolacca Decandra.</i>
Keen, Francis,	Philadelphia, "	<i>Guaiaci Lignum.</i>
Kennedy, Charles W.,	" "	<i>Arctostaphylos Uva Ursi.</i>
Lindsay, John B.,	" "	<i>Gossypii Radicis Cortex.</i>
Milner, James P.,	" "	<i>The Apothecary &amp; Physicians.</i>
Moser, Americus H.,	Allentown, "	<i>Lactucarium.</i>
McElroy, James B.,	Philadelphia, "	{ <i>Preparations of the Pharmacopæia.</i>
Notson, Charles B.,	" "	<i>Sanguinaria Canadensis.</i>
Orth, Frederick C.,	Hummelston, "	<i>Arnica Plaster.</i>
Preston, David,	Fallstown, Md.,	<i>Capsicum Annuum.</i>
Ranck, J. W.,	Philadelphia, Pa.,	<i>Datura Stramonium.</i>
Rinker, Wm. H.,	Roxborough, "	<i>Geranium Maculatum.</i>
Rubincam, Charles E.,	Philadelphia, "	<i>Ceanothus Americanus.</i>
Rutherford, Charles,	" "	<i>Iodide of Potassium.</i>
Smith, Wilson B.	" "	<i>Sarracenia Purpurea.</i>
Vogelbach, Edmund,	" "	<i>Petroleum.</i>
Walker, John Thomas,	" "	<i>Medicinæ Puritas.</i>
Wendel, Edward,	" "	<i>Sambucus Canadensis.</i>
Wendel, Frederick,	" "	<i>Phosphorus and its Compounds.</i>
White, James,	" "	<i>Phytolacca Decandra.</i>

The Minutes of the Board of Trustees inform farther, that a portrait in oil of Prof. Joseph Carson has been presented to the College by the graduating class of 1865.

The Committee appointed to prepare a memorial of the late Henry Troth, presented an interesting sketch of his life, drawn up by Samuel F. Troth, which was read, and, on motion, referred to the Committee on Deceased Members.

Dillwyn Parrish read an interesting memorial of Chas. Marshall, the first President of this College, which, on motion, was referred to the Publishing Committee.

The Publishing Committee report, that the American Journal of



Pharmacy has been issued regularly since the last Annual Meeting. Owing to the increased cost of paper and printing, the size of the number was reduced in September last from 96 to 80 pages, the subscription price remaining unchanged. By this course the College has not been called upon for funds, as the collections have proved sufficient to carry on the work, with rigid economy; yet the Editor regrets his inability to republish several valuable papers, owing to the cost of their illustrations.

The condition of the finances of the Journal are exhibited in the appended report of the Treasurer, which presents a small balance in favor of the Committee.

C. ELLIS,                      A. B. TAYLOR,  
W. PROCTER, JR.,        J. M. MAISCH,  
E. PARRISH.

The Committee on Latin Labels presented a report, which was read and accepted, from which we learn that labels to the value of \$574 remain on hand, and a cash balance of \$99.

The following Report of the Committee on Sinking Fund was read, accepted, and an order directed to be drawn on the Treasurer of the College, as requested.

PHILADELPHIA, Third mo. 27th, 1865.

*To the Philadelphia College of Pharmacy :*

The Committee on the Sinking Fund report, That since the last Annual Meeting of the College, they have received from the Committee on Latin Labels five hundred dollars, and have paid that amount to S. N. James on account of mortgage, reducing the debt of the College to \$1000.

From the Annual Report of our Treasurer, there appears to be rather more in his hands, together with the annual subscriptions now due, than necessary for the current expenses of the College; and we therefore propose that an order be drawn in favor of the Committee on the Sinking Fund for two hundred dollars, to be applied to the remaining debt of the College.

Respectfully,

SAMUEL F. TROTH,  
AMBROSE SMITH,  
EDWARD PARRISH,  
*Committee.*

A letter from Prof. Chas. Murray, of Buenos Ayres, dated December 26, 1864, was read by the Corresponding Secretary, Prof. Procter. Mr. Murray acknowledges the notice of his election to honorary membership in this College.

After some discussion on a proposed alteration in law 5, section 8 of the By-laws, concerning members, the subject was for the present laid upon the table.

The propriety of publishing the list of the graduating class in the Jour-

nal in the order of merit, having claimed consideration, it was deemed inexpedient at this time to depart from the usual alphabetical order.

Mr. Thomas S. Wiegand informed the College of the establishment of an Alumni Association, consisting of the graduates of this College previous to the year 1850, and such others, since that date, as may have been elected to membership. One of the objects of the Association being the establishment of a Pharmaceutical Laboratory in connection with the College, the following resolution, offered by Prof. Parrish, was adopted :

*Resolved*, That the subject of establishing a Laboratory for instruction in Practical Chemistry and Pharmacy in the College Building, and a Professorship of Botany for imparting the elements of that science, by lectures during the summer season, as well as throughout the ordinary, lecture term, is recommended to the consideration of the Board of Trustees.

The annual election of officers being ordered, the tellers reported the following officers elected.

<i>President</i> ,	Charles Ellis.
<i>First Vice-President</i> ,	S. F. Troth.
<i>Second Vice-President</i> ,	Dillwyn Parrish.
<i>Treasurer</i> ,	Ambrose Smith.
<i>Recording Secretary</i> ,	Chas. Bullock.
<i>Corresponding Sec'y</i> ,	Wm. Procter, Jr.

*Trustees.*

Prof. Robert Bridges,	S. N. James,	T. M. Perot,
S. S. Bunting,	J. T. Shinn,	J. M. Maisch,
T. S. Wiegand,	D. S. Jones.	

*Publishing Committee.*

Charles Ellis,	Edward Parrish,	John M. Maisch,
A. B. Taylor,	William Procter, Jr.	

*Committee on Sinking Fund.*

Samuel F. Troth,	Ambrose Smith,	Edward Parrish.
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*Delegates to the American Pharmaceutical Association.*

Dr. W. H. Pile,	E. Parrish,	J. M. Maisch,
E. T. Ellis,	D. S. Jones.	

On motion, the College then adjourned.

CHAS. BULLOCK,  
*Recording Sec'y.*

## Editorial Department.

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THE U. S. ARMY LABORATORY AT NEW YORK.—This extensive Laboratory, located at Astoria, on Long Island, a few miles from the city of New York, was destroyed by fire on Monday morning, the 20th of February. The fire, which occurred in the day time, commenced in the ceiling over the drying room, which must have been improperly constructed. From this point the flames rapidly extended to other parts of the building, which was soon a heap of ruins, including the apartments occupied by Dr. J. H. Bill, Ass. Surg. U. S. Army, whose chemical knowledge had caused him to be selected as the director of the Laboratory. The loss to the Government, variously estimated, is said to be \$50,000, a portion of which was probably stock. We understand Dr. Bill made a statistical report to the Washington Bureau some time ago which was highly favorable to the usefulness and economy of this Laboratory.

As the establishment of the two Laboratories was an act of the late Surgeon-General Hammond, without adequate authority, Surgeon-General Barnes declined re-establishing this without an act of Congress. An idea may be formed of the magnitude of the operations of the Astoria Laboratory, when one House, since the fire, has been called upon to powder for the Army 27 cases of opium, 32 ceroons of ipecac, 18 ceroons of calisaya bark, and 280 bags of cubebs, and other things in proportion.

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ST. LOUIS COLLEGE OF PHARMACY.—We are informed by Mr. Enno Sander, of St. Louis, that the College there have established a Chair of Botany as the first effort in connection with the School of Pharmacy, to be commenced the ensuing winter; and Prof. Wadgymar, now of the Academy of Christian Brothers, is the occupant.

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*The Dispensatory of the United States of America.* By GEORGE B. WOOD, M. D., &c., and FRANKLIN BACHE, M. D., &c. &c. Twelfth Edition, carefully revised. Philadelphia: J. B. Lippincott & Co. 1865. Pp. 1704. Octavo.

After an interval of more than seven years since the eleventh edition, a new edition of the Dispensatory, long looked for, has been received. In appearance it is like its predecessors, having the same size and style of type, and the page, though a little larger, appears the same. Many of the additions are in notes, in small type, in the first and second parts; whilst the third part, on non-official drugs and medicines, has been considerably extended. The book, though not so thick as its predecessor, has one hundred and twenty more pages,—the paper being thinner than in earlier editions.

We cannot do better than to give the Authors' own reasons why this edition has been delayed, and why its revision required an unusual amount of revisional labor. Few readers require to be informed of the decease of Dr. Bache, one of the authors of the work, which threw the whole responsibility of the revision upon Dr. Wood, at a time when circumstances called for an unusual number of changes and great clearness of judgment.

"The delay of the revision was caused by the unfinished state of the Pharmacopœias, which were to constitute the basis of the new edition, as the old Pharmacopœias had done of the preceding. It was known that the U. S. Pharmacopœia was undergoing a thorough revision, with many and important changes; and it was equally notorious that the three British Pharmacopœias were in the course of consolidation into one; which, it was supposed, would retain few features of the former works, and almost none unaltered. Under these circumstances, it would have been folly to undertake a new revision of the Dispensatory, which, when completed, would in a short time have had its whole foundation undermined."

"In the second place, the changes made both in our own and the British Pharmacopœias, rendered indispensable similar changes in the Dispensatory. One not familiar with the subject can scarcely appreciate the constant vigilance, the unceasing attention to the minutest details running through every part of the work, which were necessary to obviate confusion and prevent embarrassing mistakes in making the book conform to the present standards. Not only was it requisite to introduce all that was new, to alter positions in conformity with the changes in the standards, and to notice and discuss all modifications, whether in substance or in form; but there was a constant recurring necessity to solve the various practical problems arising from the substitution of a single one for the three former British Pharmacopœias, which were referred to at a greater or less length in almost every page.

"Taking these circumstances into consideration, and reflecting, in the third place, how greatly the field of labor has been extended for the surviving author by the decease of his colleague, the reader will understand that he has had a very heavy task upon his hands, and will not be disposed to censure him for a delay in the appearance of the present edition, which could have been shortened only at the expense of the usefulness and trustworthiness of the work itself."

In glancing over the pages on *Materia Medica*, detailed notices of many new articles, officinal in either the U. S. or British Pharmacopœias, will be found, among which are chronic, lactic and glacial phosphoric acids, *Bela*, *Berberis*, *Caffea*, *Cypripedium*, *Gelseminum*, *Gutta percha*, *Hydrastis*, carbonate of lithia, permanganate of potassa, *Leptandra*, *Ol. Camphoræ*, *Ol. Theobromæ*, *Ol. Thymi*, *Pepo*, *Rottlera*, *Santonica*, *Sodæ sulphis*, *spt. Frumenti*, *spt. Myrciæ*, *vanilla*, &c., besides many to be found in the third part of the work of lesser importance or not officinal. An examination



of the leading articles of the *Materia Medica* will show that Dr. Wood has brought the subjects fully up to the time of revision.

The most laborious part of the revision refers to the second—or pharmaceutical part—which the new Pharmacopœias have required to be greatly changed, both in arrangement and detail. In the preliminary notice of this portion of the book, it will be observed that percolation has been more fully dilated upon than heretofore, as the principal means of extraction of our Pharmacopœia. Owing to the adoption of *avoirdupois* weight in the British Pharmacopœia, all the recipes from that work employ that weight. To avoid the great liability to confusion thus engendered, Dr. Wood has indicated in almost every case the kind of weight to be used. A great number of formulæ for fluid extracts and other preparations have been introduced in various parts of the work, besides those of the Pharmacopœia, which will be found noted in the index.

The changes and additions are so numerous that, in the short time and small space at our disposal, we have not attempted to exhibit them; considering that the work will soon be in the hands of a large number of pharmacæutists, who, by a direct examination, can satisfy themselves.

The additions to part third amount to about thirty pages of small type, among which the author has particularly specified the articles on anilin, Calabar bean, carbolic acid, coal tar, peroxide of hydrogen, petroleum, propylamin, sorghum, thallium, upas, &c. It has been his aim to bring into this part everything of any decided interest worthy of notice in a Dispensatory outside of the official lists, and the reader will find it much extended.

The table of chemical equivalents has been carefully revised and extended, and those relating to specific gravity have been revised and extended under the care of Dr. W. H. Pile, of Philadelphia, whose familiarity with all matters relating to this branch of the subject is well known. We understand the nominal retail price of the Dispensatory is ten dollars, on which a liberal discount is made by the publishers.

We cannot conclude this notice better than by giving the following extract from the Preface: "Finally, it may be permitted to the surviving author to say that, considering his advanced age, it is hardly probable that he will live to see, or at least participate in, another revision; and under these circumstances, to express his warm thanks to the members of the Medical and Pharmaceutical Professions, who have in so many ways evinced a kind regard for him personally, and a disposition to judge favorably if not partially of his works."

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*Report of the Pennsylvania Hospital for the Insane for the year 1864.* By Thomas S. Kirkbride, M. D., Physician-in-Chief. Published by order of the Board of Managers. Philada., 1865; pp. 66.

The reception of the annual report of this excellent Institution is acknowledged.

*Medical Lexicon. A Dictionary of Medical Science*; containing a concise explanation of the various subjects and terms of Anatomy, Physiology, Pathology, Hygiene, Therapeutics, Pharmacology, Pharmacy, Surgery, Obstetrics, Medical Jurisprudence and Dentistry: notices of climate and mineral waters, formulæ for officinal, empyrical and dietetic preparations, with the accentuation and etymology of the terms; and the French and other synonymes, so as to constitute a French as well as an English Medical Lexicon. By ROBLEY DUNGLISON, M.D., LL. D., &c. Thoroughly revised and very greatly modified and augmented. Philadelphia: Blanchard & Lea, 1865; pp. 1047 octavo.

On another occasion (January, 1858) we have noticed this work, so long before the medical reader, and then much improved on previous editions. There is, perhaps, no class of books more liable to contain errors than dictionaries of science, where the scope is so great as to embody such a vast variety of subjects. The compiler, unless his erudition is very great, is so dependent on published statements of facts, or substances, or principles, with which he is not familiar, that he is not always able to correct the errors or supply the omissions of others, and thus occurs a fruitful source of deficiency. Besides these, which are incident to the first edition, are those which arise out of an imperfect acquaintance with the progress of knowledge in its transition state in the Journals and before it has been digested and made a part of regular treatises. The revisor of such a work as that before us, needs to be constantly on the alert to gather facts as they are developed, and to modify the statements in his pages to correspond with this progress in each department, always, however, subject to his judgment of its truthfulness. Hence, the author of a dictionary of the medical sciences must be, at least theoretically, an anatomist, a physiologist, a surgeon, a therapist, an obstetrician, a pharmacologist, a chemist, a botanist, a pharmacist, and, above all, a practitioner of medicine. Added to this, his classical knowledge must be extensive and critical; his acquaintance with language varied and exact; and his industry and perseverance perennial and untiring. Among those who have undertaken this department, we know of no one better fitted by his extensive reading, classical attainments and experience as an author, than Dr. Dunglison; and, in preparing this last edition for the press, he has given more than usual time and attention to the general details, and more especially to the etymology and accentuation of the terms. In regard to the latter, however, no general division of the words into syllables, as in Thomas' Medical Dictionary, has been attempted, nor any imitation of the sounds by which it can claim to be a pronouncing dictionary. In glancing over many of the pages, we find some instances of omissions to give late information on pharmacological subjects, especially of their chemistry and composition, and we would have been pleased to find a more general introduction of common names in the alphabetical order; as for instance, "Calabar bean" and "coca," the most familiar terms to express these

drugs, are not found in place, but the first as "ordeal bean;" and the last under its generic term—*Erythroxyton*. We cannot find the word *dialysis*, in its more recent meaning as expressing liquid diffusion through a septum, either under that head or under osmose, exosmose, or endosmose. Doubtless in other departments the same may be noticed, but there is so much that is new and satisfactory that these may be overlooked.

The volume is well printed, and is bound in leather, as it should be, doing credit to the publishers. Though more specially suited to the physician's library, there is so much in it of interest to the pharmacist, that all who aim at completeness of information should be provided with this medical dictionary.

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*First Annual Report of the Alumni Association of the Philadelphia College of Pharmacy.* Containing also the Valedictory Address delivered to the Graduating Class of 1865, by Edward Parrish, Prof. of Materia Medica in the College. Philadelphia: 1865, pp. 34.

This first of a series of annual reports commences a new era in the history of the graduates of the Philadelphia College of Pharmacy. As hinted at in our March number, the Association met at the Hall of the Philadelphia College of Pharmacy, on Thursday the 9th of March, 1865, William C. Bakes presiding, Hiram Gold, Secretary. From the minutes it appears that twenty-one members were elected during the year, and a certificate of membership designed and partially executed. The President then addressed the meeting, and proposed that the new constitution, prepared by the Executive Board, should be substituted for the old one, then in force, which, after due discussion, was carried into effect. A Nominating Committee was then appointed, and the annual report of the Treasurer read and approved. After due consideration, it was resolved that all graduates of the Philadelphia College of Pharmacy, prior to 1850, be admitted members of the Association, with all the rights and privileges thereunto appertaining, without the payment of any annual dues.

The second session was held on Saturday, March 11th; the President in the Chair. The roll was called; the minutes read and approved, and the Report of the Committee on Nominations called for, which was as follows:

For <i>President</i> ,	Thomas S. Wiegand,	Class 1844.
<i>First Vice-President</i> ,	Charles L. Eberle,	" 1859.
<i>Second Vice-President</i> ,	Ferris Bringhamst,	" 1857.
<i>Recording Secretary</i> ,	William C. Bakes,	" 1855.
<i>Corresponding Secretary</i> ,	Alfred Mellor,	" 1863.
<i>Treasurer</i> ,	Richard M. Shoemaker,	" 1862.



*Executive Board.*

George W. Eldridge,	1863.	E. C. Jones,	1864.
Henry C. Croft,	1864.	D. L. Witmer,	1862.
A. P. Brown,	1862.	J. H. C. Simes,	1864.

The report, which was signed by its chairman, Albert F. Ebert, of Chicago, was accepted, and an election ordered, which resulted in the election of the nominees.

In the absence of the President elect, Mr. Eberle took the chair. A vote of thanks to the retiring officers was passed, and, after some other business, Mr. Bakes offered the following :

*"Whereas, As Graduates of a time-honored Institution, we feel the warmest interest in its future welfare and usefulness, and deem it no less a privilege than a duty to use every effort to secure for our Alma Mater the position to which she is entitled ; and*

*"Whereas, Many of us have long cherished the idea of establishing a Practical School in connection with our College, where the branches of Pharmacy and Chemistry might be more thoroughly acquired, therefore,*

*"Be it resolved, That a sinking fund be created for this purpose out of the surplus funds of the Association ; and that a committee be appointed by the Executive Board, to be known as the Trustees of Sinking Fund, whose duty it shall be, to take charge of, and solicit subscriptions to, this fund, and invest the same as they may judge safe and profitable, until a sufficient amount shall have been acquired to aid in the accomplishment of the end in view."*

After free discussion the preamble and resolution were unanimously adopted. The preparation of voluntary essays for reading at the next annual meeting was considered, and nine members agreed to produce such papers. Prof. Parrish being present was invited to address the meeting, which he did in favor of the proposed objects. The Secretary was requested to prepare the annual report, submit it to the Board, and, if approved, to have it printed, together with the Constitution, the proceedings, list of members, and the Valedictory Address ; when the meeting adjourned. The idea of establishing a practical school of Chemistry and Pharmacy under the auspices of our College has long been entertained, but the great expense attending its execution in a manner creditable to the College has rendered it inadmissible heretofore to take any steps to effect it. Should the measures now being instituted by the Alumni prove adequate to its accomplishment, results highly favorable to their efforts and creditable to the institution may be looked for. The inability of the College, in its present scheme of tuition, to afford practical instruction, has prevented it from insisting on so thorough a preparation as would be best for its reputation, necessarily leaving to the several preceptors of students the important business of practical familiarity with manipulation and laboratory work in general, and confining its teaching to lectures and such practical illustrations as can be presented to the



eye in passing. At the annual meeting of the College a resolution was passed requesting the Board of Trustees to give the idea consideration.

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*The Pharmacutists' and Druggists' Practical Receipt Book*, with a Glossary of Medical Terms, and a copious Index. By THOMAS F. BRANSTON. Philadelphia: Lindsay & Blakiston. 1865. Pp. 307. Duo.

This is another added to the list of "Druggists' Receipt Books," and claims merit on the ground that it consists of *officinal* formulæ mixed up alphabetically with popular and other recipes, used, or which may be used, by druggists. In our opinion, it is calculated to do more harm than good, by presenting only the obsolete recipes of the late London Pharmacopœia to the American apothecary and druggist, who is required to use our own Codex. As a collection of miscellaneous recipes, it is all well enough; but we protest against presenting "as preparations of the Pharmacopœia" those which have no authority here or in England at this time.

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*Alphabetical Index to Braithwaite's Retrospect. Embracing parts one to fifty, 1840—1865.* Comprising twenty-five years of republication. New York: Published by Stringer & Townsend. 1865. Pp. 247, octavo.

This volume will be received with satisfaction by all readers of Braithwaite, as well as by all who have occasion to make researches on medical subjects, as greatly facilitating the labor of referring to the numerous volumes of this series.

By possessing this "General Index," any physician can, in a short time, ascertain whether wanted information can probably be found in the Retrospect. Price, \$1 in paper; \$1 75 in sheep, free of postage.

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*An Obituary Notice of Dr. William Darlington; Read before the American Philosophical Society, Feb. 19, 1864.* By T. P. James. From the Author.

We have already published an obituary notice of this excellent man and eminent botanist, and receive with pleasure this biographical sketch for reference.

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*Nordamericanische, Deutsch Medicinische Zeitschrift, für Praktische Heilkunde.* Zweimonatlich. Herausgeben von W. Meisburger, M. D. Buffalo, N. Y., vol. i. No. 1, April, 1865. (The North American German Medical Times.)

This periodical is commenced with the view of offering to German physicians a substitute for the German journals, the high price of which at present prevents them from being imported. The Editor thinks, by a careful selection of articles, he can give those best suited to the German-American reader, excluding those numerous papers having but little bearing on the practice of medicine.

THE  
AMERICAN JOURNAL OF PHARMACY.

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JULY, 1865.

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BIOGRAPHICAL SKETCH OF CHARLES MARSHALL,  
First President of the Philadelphia College of Pharmacy.

*Read at the Meeting of the College, March, 1865.*

BY DILLWYN PARRISH.

Charles Marshall, the first President of the Philadelphia College of Pharmacy, was born in Philadelphia on the 8th day of 5th month, 1744, and died on the 22d day of 8th month, 1825, aged about 81 years.

His father, Christopher Marshall, opened a drug and chemical store about the middle of the last century, on the south side of Chestnut, above Second street, Philadelphia. His business was conducted in a two-storied building, with a projecting roof, from which was suspended a large gilded ball, the sign by which his store was designated. One of the newspapers of that period informs the public that a choice assortment of fresh teas had been added to the stock of drugs and medicines. His son and successor, Charles Marshall, received his pharmaceutical education in this establishment. He is said to have possessed a fine literary taste, and, before entering upon his apprenticeship, was well instructed, not only in the usual branches of an English education, as then taught in the best schools, but also in the Latin and Greek languages.

On attaining his majority, Charles Marshall entered into partnership with his father and elder brother, and, on their retirement from the business, became sole proprietor. Unlike the pharmaceutists of the present day, who receive a large proportion of their remedies in a finished state from the extensive laboratories which now abound, it was necessary for him to be

both botanist and chemist, and to superintend the preparation and manufacture of most of the remedies then in use. For this department he had a remarkable aptitude, and his skill and integrity contributed largely to the reputation of the establishment.

In the early part of the present century, after a long career of usefulness and prosperity, he retired from the active duties of business, and resigned it to his son and successor, (afterwards a member of this Collège,) and having acquired an ample competence, he entered upon the enjoyment of those literary and domestic tastes which were so congenial to him.

By the concurrent testimony of his cotemporaries, he possessed scrupulous probity of character, combined with great urbanity of manners. He was beloved by a large circle of friends, and his house was the abode of refinement and hospitality. In this connection we may remember the testimony of one of our colleagues, who, near the close of life, in recurring to the family of Marshall's, with whom he had served his apprenticeship, made the assertion that "few nobler men ever lived than Charles Marshall."

We cannot better describe his personal appearance than in the language of one who knew him long and intimately in the domestic circle:

"In stature, Charles Marshall was about six feet high, of slender mould, clear complexion, blue eyes, and graced with a benignant expression of countenance, heightened in its effect towards the close of life by the snowy whiteness of his hair, which, in ample volume, descended nearly to his shoulders. His costume was uniformly plain, and equally uniform in color, being the drab then in vogue with the Society of Friends, of which he was a consistent and life-long member."

A few years after his retirement from active business, the establishment with which his name had been for many years associated, loaned the endorsement of the firm to a large amount, and involved all connected with it in bankruptcy. The senior partner, who was entirely ignorant of these proceedings, was then in advanced life; but he met the shock with fortitude, and without hesitation gave up his property for the benefit of the creditors.

It may seem unnecessary to revive this painful portion of the history, but it is done that it may prove a beacon to those who may be similarly circumstanced.

This sad occurrence made it necessary to change his manner of life, and in 1804 it was concluded that his daughter Elizabeth, a lady of singular good sense, and varied attainments, should open a store and conduct the business of a pharmacist, with the aid of her father. The small front parlor of their dwelling (then 56 Chestnut street, opposite Strawberry alley,) was appropriated to this purpose. Many of the leading physicians and citizens, sympathizing with the calamity, and knowing the worth and integrity of the venerable Charles Marshall, lent their influence to promote these laudable endeavors. The gradual, but sure extension of the business followed. The little front parlor, with its small stock of medicines, was made to expand its dimensions, to meet the demands of its customers; the back buildings were extended, and taken into the store on Chestnut street; an ice house and laboratory were added to the establishment, as also a wholesale warehouse, from whose ample stores many country physicians and storekeepers obtained their supplies of genuine drugs and medicines; a number of apprentices and assistants, varying from six to twelve, were constantly employed. The maiden pharmacist presided with dignity and skill, and, under her judicious management, restored to her family a liberal competence. This excellent woman departed this life on the 26th day of 6th month, 1836.

She continued the business till the year 1825, when she withdrew, leaving it in the hands of two of the former apprentices—"Ellis & Morris,"—afterwards Charles Ellis & Co., the former the present presiding officer of our College.

The establishment at 56 Chestnut street was always renowned for the extent and integrity of its transactions. I have been unable to ascertain how many members of this College (in the past and present) have received their pharmaceutical education within its walls, but it has certainly contributed a large number to our ranks. Some of these still survive, and cherish with pleasant and grateful recollections, the time spent in acquiring a knowledge of their profession.



When the University of Pennsylvania assumed to issue diplomas to practitioners of pharmacy, and to prescribe the conditions of the grant, the pharmacutists of Philadelphia felt it to be an infraction of their rights, and established this College in 1824; and it is a proof of their appreciation of the character of Charles Marshall, that he was unanimously elected their first President. Though far advanced in years, and unable to take an active part in its proceedings, the measure had his full support and encouragement.

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### BIOGRAPHICAL SKETCH OF HENRY TROTH,

Late Vice-President of the Philadelphia College of Pharmacy.

*Read at the meeting of the College, September, 1865.*

Henry Troth was born in Talbot County, Maryland, Ninth month (September) 4th, 1794, being descended from William Troth, who settled under the humane and tolerant administration of Lord Baltimore, in 1685. The boyhood of Henry Troth was chiefly spent on a farm distant from any school, and at about the age of 14 he accompanied a near relative to Tioga County, Pennsylvania, then known as the "backwoods," where he spent two years in pursuit of deer, wild turkey and other game, with the occasional experience of a farmer's life.

He then came to Philadelphia to seek his fortunes, and entered with Jeremiah Morris, Druggist and Apothecary, on the north side of Market below 8th street. He was an inmate of the family of his employer, and his only assistant. His master was esteemed a superior man, but had no taste for the drudgery of the shop, as illustrating which, Henry used to relate that, on one occasion, he obtained leave of absence to visit his family in Maryland, in that day a tedious journey by stage, on condition that he should leave an ample supply of salts, senna and manna, magnesia, cream of tartar, and so forth, all ready folded in "fipenny-bit packages," that his master might dispatch business without so often soiling his hands. Human nature seems to carry very similar traits through generations, as they pass.

Henry Troth was both an industrious and a studious youth, and he made the best of the few useful and interesting books

then accessible ; these he would buy at auction, and when their contents were mastered would have them sold again, sometimes at a profit.

Before his apprenticeship was over he obtained a release from his worthy master, to enable him to enter business on his own account with a relative willing to advance the necessary capital for a small beginning. This was at the close of the war of 1812, when those who embarked in business with large outlays mostly came to an end in a few years ; but the young firm, by "making two dollars and spending only one," soon established the business on a firm basis and prospered.

Previous to the establishment of this College in 1821, Henry Troth was strongly impressed with the availability of such an organization, and to his untiring energy and devotion to its interests the successful establishment and maintenance of the institution was for some years mainly due. He was remarkable for the punctuality and steadiness of his attendance of its meetings and that of its Board of Trustees, over which he presided for many years.

His public spirit was manifested in many other useful institutions. In the Apprentices' Library he was one of the most efficient members, from its establishment to the time of his death, every page of its history exhibiting his efficiency and zeal in promoting the improvement and happiness of apprentices, of whose needs and wants he had a lively sense.

The same generous impulses led him to become an efficient Manager of the House of Refuge for juvenile delinquents. He served for many years on the Committee to find homes for such of the inmates as were sufficiently reformed to bind out as apprentices, to the country.

When about 28 years of age, Henry Troth became, by the choice of the people, a member of the Common Council of Philadelphia, over which body he was afterwards chosen to preside. He was one of the first to advocate the introduction of gas for lighting the city, an improvement which met with persevering opposition from those who apprehended numerous dangers and disasters as inevitable. He was among the first to introduce the use of coal as a fuel, and many persons took his grate as a pat-

tern for the construction of this afterwards popular means of warming apartments. As early as 1826 he became a Manager of the Schuylkill Navigation Company, and during 16 years that he was connected with it, saw the transportation of anthracite coal increase from 35,000 tons, in 1825, to 953,899 tons in 1841, while in 1864 it reached nearly ten millions of tons.

In conclusion, we may appropriately refer to our late Vice-President, not only as a man of thorough integrity and uprightness, but as illustrating in his example how a successful business man, devoted zealously to his own interests, may at the same time be instrumental in developing and promoting the interests of his fellow men, and, by bringing all his powers into activity, may accomplish a work in the world which will cause him to be regarded as an example of energy and philanthropy.

## ON ARNICA PLASTER.

BY FREDERICK C. ORTH.

The preparations of arnica flowers are receiving and rapidly gaining favor with the medical profession, being highly extolled in domestic practice as a most useful, popular and efficacious remedy, applied to sprains, bruises and rheumatic affections generally.

The forms usually employed are the tincture and plaster; both these preparations, as well as an alcoholic extract (solid) have been introduced into the last edition of the Pharmacopœia.

In accordance with the suggestion of our Professor of Pharmacy, the subject of the preparation of arnica plaster has been adopted. Previous to making the plaster several extracts were prepared, with the view of ascertaining the quantity of extract respectively yielded by several processes. The first was prepared according to the formula given in the United States Pharmacopœia, as follows: Take of

Arnica flowers, in moderately fine powder, 24 troyounces.

Alcohol, 4 pints.

Water, 2 pints. . . . .

Diluted alcohol a sufficient quantity.

Mix the alcohol and water and moisten the powder with a pint of the mixture; then pack it firm in a cylindrical percolator, and gradually pour on the remainder of the mixture. Continue the percolation with diluted alcohol until six pints of tincture have passed. Lastly, evaporate this by means of a water-bath to the proper consistence.

This process yielded 20 per cent. of the extract. In making the second extract I have been guided by the formula given by Prof. Procter, in the Amer. Jour. of Pharmacy, iii. series, vol. iii. No. vi., as follows:

Arnica flowers, twelve troyounces.

Alcohol, three pints.

Water, one pint.

Mix the alcohol and water, and pour two pints of the mixture over the arnica, previously finely bruised. Allow it to stand for 48 hours, pack it firmly in a percolator, and pour on the remainder of the mixture until three pints are obtained. Evaporate this tincture in a water-bath (or still) till reduced to a soft resinous extract.

This extract I evaporated still further, in order to obtain it, as near as possible, of the same consistence as the preceding.

The yield of this process was 16 per cent. or 4 per cent. less than the officinal. But whether the 20 per cent. of the officinal process is of more medicinal value than the 16 per cent. of Prof. Procter's process, I am unable to say at present.

I will now proceed to the preparation of the plaster.

Plaster No. I. was prepared according to the officinal formula, as follows: Take of

Alcoholic extract of arnica a troyounce and a half.

Resin plaster, three troyounces.

Add the extract to the plaster, previously melted by means of a water-bath, and mix them.

The plaster thus prepared has a deep yellowish-brown color and is adhesive, spreads readily, though somewhat soft, more so than desirable at the temperature of the skin.

Plaster No. II. was made by taking of alcoholic extract of arnica, a troyounce; resin plaster, two troyounces; Burgundy



pitch half a troyounce. Melt the resin plaster and pitch together in a water-bath, add the extract and mix thoroughly.

This plaster is uniform in texture, spreading quite as readily as the preceding, and is of a more desirable consistence.

Plaster No. III. was prepared from the unofficinal extract, by taking the same proportions and making in the same manner as the officinal. This plaster spreads readily, but the same objection exists as in the officinal or No. I., it being too soft at the temperature of the skin.

Plaster No. IV. The proportions in this plaster vary from the officinal, to wit: Take of the

Alcoholic extract of arnica a troyounce.

Resin plaster three troyounces.

Made as the preceding. Its general properties are the same as Plaster No. I., only lighter in color.

Plaster No. V. This differs from the preceding and is suggested for reasons which will be herein stated. The following is the formula: Take of

Alcoholic extract of arnica, a troyounce.

Resin plaster, two troyounces.

Burgundy pitch, 120 grains.

Cerate of Cantharides, 180 grains.

Melt the plaster and pitch together in a water-bath, and add the extract; finally add the cerate and mix.

This plaster presents much the same appearance as Plaster No. II., spreads as readily and has the same consistence. In some cases this may be preferable to the ordinary arnica plaster, it being of a more decided rubefacient character and yet not containing sufficient cantharidis to produce vesication.

From the foregoing experiments I discovered that the addition of Burgundy pitch, in the proportion given in the formula for Plaster No. II., forms a very adhesive as well as a consistent plaster, and I think will give satisfaction to both physician and patient who may have occasion to prescribe and use the arnica plaster.

In concluding my essay, I was in the hope of presenting the opinion and experience of several physicians of our city, to whom

I gave plasters made of the results of my experiments, to test their quality and virtues ; but I regret that I have been unable to report them in consequence of their not having had cases where the application of the arnica plaster was called for, or would have been judicious.

Philadelphia, January, 1865.

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PHARMACEUTICAL NOTICES. .

By GEORGE A. GROSS.

*Tinctura Opii.*

Owing to the greatly increased price of alcohol, it occurred to me that a preparation of opium, containing all the desirable properties of the drug, and containing only half as much alcohol as the official tincture, or just sufficient to act as a preservative agent, would be desirable to the pharmacist.

With this view, Oij. tr. opii were prepared in the following manner: The opium was first grated fine, put into a vessel, hot water poured over it, and allowed to macerate for twelve hours. It was then transferred to a percolator and treated with water until Oiss. had passed. The percolation was necessarily very slow. After this quantity of liquor was obtained, half a pint of alcohol, sp. gr. .835, was added, and the whole filtered. The result was a clear tincture, not quite as dark colored as the official, but possessing all the desirable qualities of that preparation.

The dregs were carefully tested for morphia, &c., but no traces could be discovered.

It is thought a tincture made in this way would be preferable to one made by the official formula, as it contains none of that disagreeable resino-extractive which is dissolved out of the opium by the alcohol, and which is of no value in the preparation, but rather an objection to it. This tincture would also be less stimulating, as it contains less alcohol, although, as the dose is so small, this circumstance would not be of much importance alone, but combining this fact with the absence of the resin, (which renders the official tincture so extremely disagreeable, the taste being retained in the mouth long after it has been taken), the conclusion

is that it would be preferred by physicians; and it certainly would be a much more profitable preparation to the pharmacist. The darker color of the officinal tincture is owing to the greater solubility of the coloring matter in alcohol than in water, and consequently it is not all taken from the opium when water only is used as a menstruum.\*

*Tinctura Opii Camphorata.*

My attention was first directed to this preparation by the frequent complaints of physicians, and other customers, about its cloudy appearance in cold weather, in consequence of the diminished solvent power of diluted alcohol for oil of anise and camphor at a low temperature.

As the design of paregoric as a remedial agent precluded the use of strong alcohol, I deemed it inadvisable to employ a stronger menstruum. Oij. of the tincture were prepared with the ingredients directed by the U. S. P., and to insure the complete solution of the oil of anise, I rubbed it up with finely powdered pumice stone, then added the camphor and benzoic acid. After thoroughly mixing the whole together it was filtered. When prepared in this manner it contained much more oil of anise, but a reduced temperature affected it the same as when prepared in the usual manner.

I then varied the process by mixing all the water and half the alcohol together with all the ingredients excepting the camphor and oil, which were rubbed up with powdered pumice stone, as before, and then mixed with the menstruum, as before stated. After filtration, one-fourth part of the remaining alcohol was poured upon the filter, and the remaining three fourths added to the filtered tincture, which rendered it perfectly clear.

[\* Laudanum prepared in this way was recommended as early as 1846 by the late Aug. Duhamel, with the alcoholic strength of the U. S. P., and subsequently by Mr. Dupuy, of New York, of the strength indicated above, (see U. S. Disp. Note to Tr. Opii). We object to the use of boiling water on account of the bassorin-like matter of the opium being taken up. Laudanum prepared in this way does not represent officinal laudanum. Those who may want to avoid the ingredients dissolved by alcohol have the deodorized tincture of the Pharmacopœia. In any case we believe this should not be substituted for the officinal laudanum without notice.—ED. AM. JOUR. PHARM.]

Thus prepared, the tincture contained fully as much oil as when prepared by the process of the U. S. P., and withstood a much greater degree of cold. At the temperature of  $40^{\circ}$  the officinal tincture was rendered quite opaque, while this retained its transparency. It also formed transparent mixtures with syr. squills and syr. ipecac.

Carb. magnesia was afterward substituted as an agent for dividing the oil, and was found to answer the purpose perfectly. The alcohol used was of sp. gr. .835.

By substituting the following process for the officinal formula, pharmacists would obtain a preparation which would be much more satisfactory to all parties interested:

Opium,	.	.	.	}	aa. grs. lx.
Benzoic acid,	.	.	.		
Camphor,	.	.	.		grs. xl.
Ol. Anisi,	.	.	.		fʒi.
Honey,	.	.	.		ʒij.
Water,	.	.	.	}	Oj.
Alcohol aa.	.	.	.		
Powd. pumice, <i>very fine</i> ,					ʒss.
Carb. of magnesia,	.				grs. cxx.

Macerate the opium with the water and Oss. alcohol for seven days and filter through paper. To this add the honey and mix thoroughly. Rub the camphor with a little alcohol until it becomes pasty, then add the powdered pumice stone, and triturate them well together, adding the oil and acid. Mix thoroughly, and add the honey and opium mixture. Then filter, and when all has passed through, wash the filter with two ounces alcohol, and, after it has passed, add the remaining six ounces of alcohol to the filtered liquid. When carb. magnesia is used, the acid should be dissolved in the six ounces of alcohol which is added finally. When it is to be prepared quickly, the equivalent proportion of tr. opii may be used in place of the opium.

#### *Extemporaneous dispensing of Ferri Iodidi in Pills and Mixtures.*

The greatly increased use of iodide of iron by medical practitioners, renders it desirable to be able to dispense this salt when ordered in a pure state.



Any attempt to do this with the solid salt as furnished to the trade is impossible, as the atmosphere will destroy any specimen, even if it were unaltered when the containing vial is first opened.

I feel the more free to direct the attention of pharmacutists to this matter, as it has already been done by Dr. D. F. Wright, of Memphis, Tenn., in the *Am. Jour. of Pharmacy* for January, 1854, and also by M. Perrens, of France, in March, 1855. The following formula is submitted as the result of experiments with this view :

R. Iodinii,	.	.	.	.	grs. xl.
Ferri redacti.,	.	.	.	.	} grs. x.
Acaciæ pulv. aa.,	.	.	.	.	
Sacchari pulv.,	.	.	.	.	grs. xx.
Glycerinæ,	.	.	.	.	gtt. xv.
Althææ pulv.,	.	.	.	.	q. s.

To be made into fifty pills.

Triturate the iodine and the iron thoroughly together, dry, until they are reduced to a fine powder ; then add the glycerine, and rub till the fumes of iodine cease to be given off, and the mixture assumes a greenish color.

Then add the powd. acacia and sugar, and lastly sufficient powd. althææ to bring to a pilular consistence.

The mass should be very stiff. When the pills are formed roll them in ferri pulv., and then coat them with tolu, as directed by the U. S. P.

This formula is not offered with a view to supersede that of the U. S. P., but as one which will do very well when iodide of iron is prescribed, combined with extracts, &c. ; or when the simple pil. ferri iodidi are ordered, and sufficient time is not given to prepare them by the officinal formula. When prepared in this way they are quite permanent.

But efficient as may be the formula here given, it may be objected to upon the ground that some portion of the iodine may escape combination, as we have not the same means of knowing that it is all combined that we have when prepared by the officinal process. Yet to be controlled in the size of pills, and unable to combine other remedies indicated by the disease is so annoying, that I have thought it best to recommend a syrup containing

25 per cent. of the solid salt, which can be added to any remedies not chemically incompatible, and, where pills are ordered, the mass rendered firm by the addition of powd. althææ and gum acaciæ. In many cases the syrup forms an excellent excipient for the pills, where powders are ordered in combination with iodide of iron.

*Oleum Peponis Seminis.*

Having seen a sample of this oil, with the history of which I was entirely ignorant, I prepared a small quantity to ascertain the appearance and some of the characteristics of the genuine article. The process adopted was that recommended by Mr. W. B. Tegetmeier, in the May number of the American Journal of Pharmacy for this year, by exhausting the crushed seeds by means of bisulphide of carbon.

The yield was  $33\frac{1}{3}$  per cent. of a thick red oil, rather rank taste, little smell, except when rubbed upon the hand, and having sp. gr. .928, at a temperature of 60° F.

Dec. 9, 1864.

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GLEANINGS FROM THE FRENCH JOURNALS.

BY THE EDITOR.

*Use of kinovic acid in medicine.*—E. De Vry. Analysis has proved that this acid exists in the leaves and root wood of the Cinchonas to the extent of 2.57 per cent., and that it has the power of breaking, in a great many cases, pernicious and non-pernicious fevers.

These facts observed on an hundred Dutch soldiers, leaves no room for doubt. It was also tried in diarrhœa and dysentery, with marked success.

M. De Vry thinks, therefore, that it will be possible to collect the leaves of the cinchonas, and prepare a tincture which will serve as a prophylactic against jungle fevers, in localities where they are endemic.

Quinine manufacturers waste considerable quantities of kinovic acid. M. De Vry is certain that the barks of all the plants of the genus *Nauclea*, which abound in the forests of Java, contain notable quantities.—*Jour. de Chim. Méd.*

*Camphorate of Quinia.*—Sr. Vincenzo Frosini Marletta suggests this salt for use in medicine for the same purpose generally that the valerianate of quinia is used ; and he believes that the camphorates generally deserve a respectable position in therapeutics.

Camphorate of quinia may be prepared either by saturating an alcoholic solution of camphoric acid with pure quinia in fragments to perfect neutralization, and evaporate to dryness at a temperature below 104° F.

Or it may be prepared by double decomposition between an alcoholic solution of camphorate of lime or potassa, and a solution of neutral sulphate of quinia. The sulphate of lime or potassa precipitates, and the camphorate of quinia remaining in the filtered solution is isolated by slow evaporation in a stove. The salt is given in doses of three-quarters of a grain (0·5 decigram) every half hour. The author prefers to give this salt in combination with antimoniate of quinia : about 5 grains of each salt, made into ten pills with extract of grey cinchona bark, of which one pill is to be given every half hour.—*Bouchard, Repert. de Pharm., Mai, 1865.*

*Agglutinative tissue.*—Dr. Fort (*Rep. de Pharm.*,) suggests as a substitute for the English isinglass plaster, a tissue made as follows :

Take of Gum arabic, selected, 5 drachms.

Distilled water, 8 “

Glycerin, a sufficient quantity.

Dissolve the gum in the water, and add sufficient glycerin to render the mucilage of the consistence of syrup. This solution is spread by means of a brush on one side of thin, glazed muslin.

The author suggests this plaster as inodorous, very supple, and as not cracking in winter, owing to the glycerin in its composition. It adheres strongly by simply moistening the surface, and can be easily removed. The author does not say whether it is hygroscopic, or ill adapted for a damp atmosphere.

*Preparation of chlorine.*—M. Shank replaces the binoxide of manganese used in making chlorine with chromate of lime, obtained economically by calcining chromate of iron (ore) with lime in a current of air. On the addition of hydrochloric acid the

greater part of the chlorine is disengaged without applying heat. The residue treated with water and the solution by milk of lime, gives a mixture of oxide of chrome and lime, which is available for the chrome manufacturers.

## ON CHEMISTRY APPLIED TO THE ARTS.

BY DR. F. CRACE CALVERT, F.R.S., F.C.S.

BONES.—Composition of raw and boiled bones. The manufacture of superphosphate of lime. Application to agriculture. Bone-black or char, and their use in sugar refining. *Phosphorus*, its properties, extraction, and employment in manufacture of matches. *Horn* and *ivory*, their composition and applications.

## LECTURE I.

I shall not take up your time by making many preliminary remarks, but merely state that though the heads of the subject on which I intend to speak are not inviting ones, still we shall find as we progress that the study of the various matters which I shall bring before you is full of interest and instruction. Further, it would be difficult to name objects which better illustrate the ability of man to turn to profitable account the various materials placed in his hands, or to mention substances which have received more complete and skilful applications than those we shall treat of this evening.

*Bones*.—The composition of “green bones,” or bones in their natural state, may be considered under two general heads, viz.:—the animal matters, consisting of a substance called *osséine* and a few blood-vessels, and the mineral matters, chiefly represented by phosphate of lime and a few other mineral salts. The composition of bones has been examined by many eminent chemists, but the most complete researches are those, published in 1855, by M. Fremy, who examined bones, not only from various classes of vertebrated animals, but also from different parts of the same animal; and to enable you to appreciate some of his conclusions, allow me to draw your attention to the following table:—\*

\* *Annales de Chimie et Physique*, volume 43, pages 79, 83, 84.



*Composition of Bones.*

Name of Bone.	Mineral Matter.	Phosphate of Lime.	Phosphate of Magnesia.	Carbonate of Lime.
Femer—Foetus 6 months	63·0	58·9	....	5·8
" Boy 18 "	61·6	58·0	0·5	2·5
" Woman 22 years	60·1	59·4	1·3	7·7
" Man 30 "	63·2	57·7	1·2	9·3
" " 40 "	64·2	56·3	1·3	10·2
" Woman 80 "	64·6	57·1	1·2	7·5
" " 97 "	60·8	51·9	1·3	9·3
" Lion(young)".....	64·7	60·0	1·5	6·3
" Sheep.....	70·0	62·9	1·5	7·7
Sperm Whale.....	62·9	51·9	0·5	10·6
Ostrich.....	70·0	.....	....	....
Carapace of Turtle.....	64·3	58·0	1·2	....
Codfish.....	61·3	.....	....	....
Stag's horn.....	61·9	58·1	traces	3·8
Cow's tooth Bone.....	67·1	60·7	1·2	2·9
" " Enamel.....	96·9	90·5	traces	2·2
" " Ivory.....	74·8	70·3	1·3	2·2
Scales of the Carp.....	34·2	33·7	traces	1·1

The first conclusion drawn by M. Fremy from these researches is, that he found a higher proportion of mineral matter than is generally admitted by chemists. Secondly, that there is no material difference in the composition of various bones taken from different parts of man, or of any one animal, but that age had a very marked influence on composition. Thus, in the bones of infants there is more animal and less mineral matter than in the adult, whilst in old age there is more mineral and less animal than in the middle-aged man. The mineral substance which chiefly increases in old age is carbonate of lime. Lastly, he could find no marked difference between the bones of man, the ox, calf, elephant, and whale; whilst in the bones of carnivorous animals and those of birds there is a slight increase in the amount of mineral matter. Allow me now to call your attention to a most interesting query. I hold in one hand the mineral matter only of a bone, which you can see retains perfectly its original form, and in the other hand I have the animal matter only of a similar bone, which also retains the form in which it previously existed, but is flexible instead of rigid. The question, therefore, arises, whether the strength and hardness of bones proceed from these two kinds of matter being combined together, or are their respective molecules merely juxtaposed? The answer is, the lat-

ter; for, as you see by this specimen, the mineral matter has been entirely removed without deforming the animal texture. Further, in the foetus it is found that the bones contain nearly the same proportions of animal and mineral matters as those of the adult. Also, it has been observed by M. Flourens, and other eminent physiologists, that the wear and tear of bones during life is repaired by the formation of new bone on the exterior surface of the bone, while the old substance is removed through the interior duct, and that the composition of the new layer is the same as that of the original bone. Let us now proceed to examine the chemical properties of the various substances composing bones, and some of the various applications which they receive in arts and manufactures. The general composition of bones may be considered to be as follows:—

BONES.				
Organic Substances	{	Blood-vessels . . . .	1	
		Osséine . . . .	32	
		Fatty Matters . . . .	9	
		Water . . . .	8	
Mineral Substances.	{	Phosphate of lime . . . .	38	
		Phosphate of magnesia . . . .	2	
		Carbonate of lime . . . .	8	
		Various salts . . . .	2	
				100

The above-named matter, *osséine*,—

C . . . .	50.4
H . . . .	6.5
N . . . .	16.9
O . . . .	26.2

and which has been erroneously called gelatine, is insoluble in water, weak acids, and alkalis, whilst gelatine presents properties directly reverse. But what has led to this popular error is that osséine, when boiled in water, becomes converted into the isomeric substance commonly called gelatine. As I shall have to dwell on this substance at some length in my next two lectures, I will not detain you now further than to state that osséine is obtained from bones by placing them in weak hydrochloric acid, which dissolves the phosphate of lime and other mineral salts, washing the animal matter (*osséine*) until all acid is removed,

drying it, and treating it with ether to remove fatty matters. I cannot leave this subject without remarking on the extraordinary stability of this animal substance, for it has been found in the bones of man and animal after many centuries, and even in small quantities in fossil bones.

*The fatty matter of bones* is made useful in the manufacture of soap, railway grease, and in other purposes; it is obtained by taking fresh bones (as bones which have been kept a long time will not yield their grease easily) and placing the spongy parts, or ends of the bones (where most of the fatty matter exists) in large boilers filled with water, which is then carried to the boil, when a part of the osseine is converted into gelatine, and the fatty matter liberated, which rises to the surface, and is easily removed. The bones thus treated are called boiled bones, and receive many important applications, to which your attention will be called in a few minutes. Benzine and bisulphuret of carbon have been used as substitutes for water in the above operation, but the advantages do not seem to have been sufficient to lead to their general adoption.

*Mineral Matter of Bones.*—These, as the foregoing tables show, are chiefly represented by phosphate and carbonate of lime. The immortal Berzelius was the first to establish the fact that phosphate of lime was the only substance possessing the properties necessary for the formation of bone, owing to the extremely simple chemical reactions which cause the soluble phosphates to become insoluble. Let us trace shortly the sources from whence we derive the large proportion of phosphate of lime which exists in our frames. Several of our most eminent chemists have proved the existence of phosphorus in sedimentary and igneous rocks, and the important part played by phosphorus in nature cannot be better conveyed to your minds than by this extract from Dr. Hofmann's learned and valued Report on the Chemical Product in the Exhibition of 1862:—"Large masses of phosphorus are, in the course of geological revolutions, extending over vast periods of time, restored from the organic reigns of nature to the mineral kingdom by the slow process of fossilisation; whereby vegetal tissues are gradually transformed into peat, lignite, and coal; and animal tissues are petrified into coprolites, which in course of time yield crystalline apatite. After

lying locked up and motionless in these forms for indefinite periods, phosphorus, by further geological movements becomes again exposed to the action of its natural solvents, water and carbonic acid, and is thus restored to active service in the organisms of plants and lower animals, through which it passes, to complete the mighty cycle of its movements into the blood and tissues of the human frame. While circulating thus, age after age, through the three kingdoms of nature, phosphorus is never for a moment free. It is throughout retained in combination with oxygen, and with the earthy or alkaline metals for which its attraction is intense." After these eminently philosophical views by Dr. Hofmann, I will proceed to call your attention to the application of bones to agriculture. Bones are generally used for manuring in one of these three forms,—1st. As ground green bones; 2d. As ground boiled bones—(that is, bones nearly deprived of their osseine by boiling under pressure, as I shall describe in my next lecture); 3d. Superphosphate of Lime.

Green or raw bones have been used on grass land for a long period, but their action is exceedingly slow and progressive, owing to the resistance of the organic matter to decomposition and the consequently slow solubility of the phosphate of lime in carbonic acid dissolved in water. What substantiates this view is that boiled bones are far more active than the above. It is found that 30 to 35 cwts. per acre of these will increase the crops on pasture land from 10 to 20 per cent. in the second year of their application. But the great advantage which agriculture has derived from the application of bones as a manure has arisen from their transformation into superphosphate of lime, especially application to root and cereal crops. To Baron Liebig is due the honor of having first called the attention of farmers (in 1840) to the importance of transforming the insoluble phosphate of lime of bones into the soluble superphosphate, rendering it susceptible of immediate absorption by the roots of plants, and of becoming at once available for their growth. These suggestions of Liebig were rapidly carried out on a practical scale by Messrs. Muspratt, of Lancashire, and J. B. Lawes, of Middlesex; and in consequence of the valuable results obtained by them, the manufacture of artificial manures has gradually grown into an important branch of manufacture in this country. The manufacturer



of superphosphate of lime is so simple that any farmer possessing a knowledge of the mere rudiments of chemistry can make it for himself, by which he will not only effect great economy, but also secure genuineness of product. All he requires is a wooden vessel lined with lead, into which he can place 1000 lbs. of ground boiled bones, 1000 lbs. of water, and 500 lbs. of sulphuric acid sp. gr. 1·845 (or concentrated vitriol), mixing the whole, and stirring well for about twelve hours. After two or three days a dry mass remains, which only requires to be taken out and placed on the land by means of the drill, or to be mixed with water and sprinkled on the land. When very large quantities of this manure are required, the plan devised by Mr. Lawes appears to be the best suited. It consists in introducing into the upper end of a slightly-inclined revolving cylinder a quantity of finely-ground boiled bones, together with a known proportion of sulphuric acid of sp. gr. 1·68. As the materials slowly descend by the revolution of the cylinder they become thoroughly mixed, and leave it in the form of a thick pasty mass, which is conducted into a large cistern capable of containing 100 tons, or a day's work. This is allowable to remain for twelve hours, when it is removed, and is ready for use. Most manufacturers find it necessary to add to the phosphate of lime of bones other sources of phosphates, such as coprolites, or the fossil dung of antediluvian animals, which have been found in large quantities in Suffolk, Cambridge-shire, and elsewhere, and contain from 36 to 62 per cent. of phosphate of lime, and from 7 to 38 per cent. of organic matter. Others employ a mineral substance called apatite, containing about 92 per cent. of phosphate of lime, and found also in large quantities in Spain Norway, France, &c. Others, again, employ guanos rich in phosphate of lime, such as those of Kooria Moorla Islands and Sombrero phosphates. The following is the average composition of the superphosphate of lime of commerce:—

Soluble phosphate	.	.	.	22 to 25 per cent.
Insoluble	"	.	.	8 " 10 "
Water	.	.	.	10 " 12 "
Sulphate of lime	.	.	.	35 " 45 "
Organic matter	.	.	.	12 " 15 "

Nitrogen, 0·75 to 1·5 per cent.

The valuable and extensive researches of Messrs. Lawes and Gilbert and Messrs. Boussingault and Ville have not only demonstrated the importance of phosphates to the growth of cereal and root crops, but also that phosphates determine, in a great measure, during vegetation, the absorption of nitrogen from the nitrates or from ammonia, as will be seen by the following table:—

*Amount of Nitrogen fixed by Wheat under the influence of following Salts:—*

	Without nitrogenated compounds.	With nitrogenated compounds.
Phosphate of lime and alkaline silicate . . .	8·15	20·08
Phosphate of lime . . .	7·25	19·17
Earths and the alkaline silicates	5·71	11·16
Earth . . . . .	3·00	9·50

*Bone-black or Char.*—In 1800 Löwitz made the interesting observation that wood charcoal possessed the remarkable property of removing coloring matters from their solutions. In 1811 Figuier also observed that animal black had far greater decolorating power than wood charcoal, and bone-black has consequently become one of the principal agents in sugar-refining, and has been the means, more than any other substance, of producing good and cheap white sugars. To give you an idea of the extent to which bone-black is used at the present day for decolorating purposes in the refining of sugar, I may state that in Paris alone it is estimated that about 11,090,000 kilogrammes of bones are used annually for that purpose. The preparation of bone-black is simple in principle. It consists in placing in cast-iron pots about 50 lbs. of broken boiled bones, that is, bones which have been deprived of their fat—of most of their osséine—and piling these pots in a furnace, where they are submitted to a gradually rising temperature during twenty-four hours, such as will completely decompose the organic matter, but not so high as to partly fuse the bones and thus render them unfit for their applications. But a more economical process is generally adopted. It consists in introducing the crushed bones into horizontal retorts, which are themselves in connexion with con-

densers, the ends of which are brought under the retorts to assist by their combustion in the distillation of the animal matter. By this arrangement not only is char obtained, but oily matters which are used by curriers, and also ammoniacal salts employed in agriculture and manufactures. The extraordinary decolorating action of animal blacks may be considered as partly chemical and partly mechanical—mechanical because it is proved, by some interesting researches of Dr. Stenhouse, to which I shall refer further on, that the action is due to the minute division of the carbon and the immense surface offered by its particles to the coloring matter, char being composed of 90 parts of mineral salts to 10 per cent. of carbon. On the other hand, the action is proved also to be chemical, by the fact that water will not remove the coloring matter, whilst a weak solution of alkali will dissolve it. Dr. Stenhouse's valuable researches not only illustrate fully this fact, but also prove the possibility of producing artificially substitutes for bone-black. In 1857 he published a paper describing the production of an artificial black, called by him aluminised charcoal. This he obtained by mixing intimately and heating finely pulverised charcoal and sulphate of alumina, when he obtained a powerful decolorating agent, containing seven per cent. of alumina, and well adapted for decolorating acid solutions, such as those of tartaric and citric acids, in chemical works. He also prepared what he called coal-tar charcoal, by melting one pound of pitch in a cast-iron pot, adding to it two pounds of coal-tar, and mixing intimately into it seven pounds of hydrate of lime, then carrying the whole to a high temperature, allowing it to cool, and removing the lime by washing the mass with hydrochloric acid and then with water, when carbon in a high state of division was obtained, possessing powerful decolorating properties. The following series of experiments by Dr. Stenhouse perfectly illustrate the chemico-physical action of animal black as a decolorating agent. He boiled a certain amount of char and his two charcoals with a solution of logwood, then treated each black separately with ammonia, when the following results were obtained:—Aluminised charcoal yielded no color; bone black but a slight amount; coal-tar charcoal large quantities. But it would be

wrong in me to leave you under the impression that animal black can only remove colors from solutions. Purified animal black—that is to say, animal black deprived of its mineral matters by the action of muriatic acid and subsequent washing—has the power of removing certain bitters from their solutions. Thus Dr. Hofmann and Professor Redwood applied this property with great skill some years ago to the detection of strychnia in beer. Again, Thomas Graham, Esq., Master of the Mint, published a most interesting series of researches, in which he established the fact that purified animal black had the power to remove a great number of saline matters from their solutions, such as the salts of lime, lead, copper, &c.

*Revivification of Bone Black.*—After a certain quantity of syrup sugar has percolated through the cylinders containing bone-black, the interstices become so clogged with impurities that it loses its power of decolorating the syrup. Sugar refiners are therefore in the habit of restoring the power of their bone-black, generally speaking, by submitting it to a process of calcination, which volatilises or destroys the organic matter fixed by the char. It has been proved by experience that char may undergo this operation about twenty times before its pores become so clogged with dirt as to render it useless. [Here the lecturer described, with the aid of drawings, several of the various apparatus used in sugar refineries for the above process, aluding particularly to that of Messrs. Pontifex and Wood, by which a ton of char is revived every twenty-four hours.] A new process, however, has been devised by Messrs. Leplay et Cuisinier, which as a whole deserves the attention of refiners, though I am aware that several of the details of their process have been used for some time. The char which has served its purpose in the cylinders, instead of being removed, is treated at once by the following processes:—It is first thoroughly washed, treated by steam to remove all viscous substances, then a weak solution of alkali is allowed to percolate through the char, which removes saline matters and a certain amount of coloring matter, when it is further acted upon by weak hydrochloric acid, which, in removing a certain amount of the lime salts, liberates the coloring matter; the char is again washed with weak alkali to



remove the remaining coloring matter, and lastly the decolorating power of the black is restored by passing through it a solution of bi-phosphate of lime. It is to be hoped that the high praise bestowed upon this process on the Continent may induce our manufacturers to try it, as they would obtain two distinct advantages by its use. First, the economy of operating at once upon the black and restoring its properties without removing it from the cylinders. Secondly, the prevention of the noxious odors given off during the revivification of char by the ordinary methods. It is interesting to note one of the results of the different employment of char in this country and on the Continent. In England the wear and tear in sugar refinery is constantly repaired by the introduction of fresh char, and there is no spent or old char for sale. In France, on the contrary, owing to the great impurities in their beet-root sugar syrups, and to the use of blood in refinery, the char becomes rapidly clogged with organic matter, and is so completely animalised, that its value as a manure exceeds what the char originally cost the refiner. The result is that French "spent" char is annually exported to the French colonies to the amount of 120,000 tons, and is there used as a manure to promote the growth of the sugar cane. So important is this article of commerce considered, that the French Government have appointed special analytical chemists to determine its value for the trade.—*Lon. Chem. News.* July 9, 1865.

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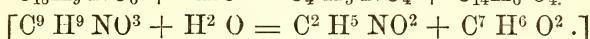
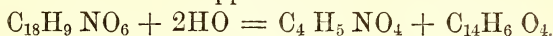
#### MEDICAL ANALYSIS; DETERMINATION OF THE PURITY OF COMMERCIAL MEDICINES.

By C. R. C. TICHBORNE, F. C. S. L.

*Acidum Benzoicum*  $HO.C_{14}H_5O_3 = 122$ . [ $C^7H^5OHO$ .]

Benzoic acid occurs in light feathery crystals, made by sublimation, which appear to be six-sided prisms. It dissolves in 200 parts of cold and 30 parts of boiling water. It is very soluble in ether and alcohol. Benzoic acid is seldom adulterated; when heated it sublimes without any residue. This is the best test that can be applied. It was once stated that naphthaline was used to adulterate this substance—the author never met with a case—but a specimen was once seen which was crystallized from

a solution, the original source of which was evident from the odor—cow's urine. It came from Germany, and was, no doubt, got by the conversion of hippuric acid into benzoic.



Hippuric Acid. Water. Glycocine. Benzoic Acid.

The decomposition may be effected by sulphuric acid, hydrochloric acid, nitric acid, oxalic acid, or by the action of a ferment.

This acid should be colorless, and should, as already stated, be entirely volatilized by heat. There should be little or no aroma, and, if any, it should possess an aromatic smell resembling vanilla. The benzoic acid, before it passes from the manufacturer's hands, is put up in one ounce bottles, which are sometimes made short weight—a common practice with both this article and sulphate of quinine.

#### *Acidum Citricum.*



Citric acid is met with in two forms—viz., in colorless right rhombic prisms, having the composition  $2 \text{C}_{12}\text{H}_8\text{O}_{14} + \text{HO}$ ; this variety constitutes the commercial article, and also another form having the composition  $2 (\text{C}_{12}\text{H}_8\text{O}_{14}) + \text{HO}$ , the water in this case probably being mechanically combined. It is soluble in 0.75 parts of cold and in 0.5 parts of boiling water; readily soluble in alcohol, but insoluble in ether.

*Tartaric acid* is the only adulteration practised with citric acid. *This fraud is best determined by adding a solution of acetate of potash to a solution of the citric acid under examination, each solution being pretty concentrated.* A precipitate of bitartrate of potash is produced if tartaric acid is present.

*Sulphuric acid, oxalic acid, and lead,* are the usual impurities occurring.

After having been examined for tartaric acid, it may be tested for these impurities in the following manner:

1. Lime water is added in excess to a dilute cold solution of the citric acid.

A white precipitate is indicative of the presence of oxalic acid.

2. The fluid in which lime water has failed to produce a precipitate, or the filtrate from the above precipitate is acidulated with hydrochloric acid, and chloride of barium added.

A white precipitate determines the presence of sulphuric acid.

The presence of lead was strikingly brought before the author by a Dublin friend having taken out of a sample of citric acid a considerable per centage of metallic lead, independently of that held in solution.\*

The presence of a trace of sulphuric acid, which is almost always present, may be overlooked in a great measure,—but the occurrence of lead and the large quantities found in commercial samples is a matter of much greater importance.

The pieces of metal found in citric acid are very small, and are imbedded in the substance of the crystals.

Citric acid should leave no perceptible ash when burned. After ignition the crucible should be washed out with diluted nitric acid and evaporated to dryness; the residue is again dissolved in water and tested with sulphide of ammonium for lead.

Sixty-seven grains of the crystals are neutralized by 100 measures of the volumetric solution of soda of the Pharmacopœia.†

\* Citrate of lead is soluble in *free* citric acid, and is not precipitated from this solution by ammonia.

† Volumetric solution of soda, B.P.

Soda  $\text{NaO} = 31$ . Take of solution of soda a sufficiency, distilled water a sufficiency. Fill the volumetric tube to O with the solution of soda, and drop this into sixty-three grains of oxalic acid, dissolved in two fluid ounces of the water until the acid is exactly neutralized, as indicated by litmus. Note the number of measures (N) of the solution used, and having then taken forty ounces of the solution of soda, augment this quantity by the addition of distilled water until it becomes

$$\frac{4000}{N} = \text{fluid ounces.}$$

If, for example  $N = 93$ , the forty ounces of solution of soda should be diluted so as to become

$$\frac{4000}{93} = 43.01 \text{ fluid ounces.}$$

The quantity of this solution which fills the volumetric tube to O includes 31 grains of soda, and will, therefore, neutralize an equivalent in grains of any monobasic acid. It is generally necessary to recrystallize the oxalic acid for titrating this volumetric solution. Mr. Maumené finds the first

It will be observed that only one-third of an equivalent in grains is neutralized by the 100 measures of volumetrical solution of soda, although that number of measures contain a full equivalent in grains of soda, which would neutralize or = one equivalent of any monobasic acid, but citric acid is what is termed a tribasic acid, and the neutral salt is a trimetallic salt. Thus—

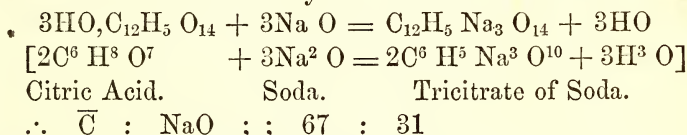
Citric Acid  $C_{12}H_8 O_{14}$

Acid Monometallic Salt  $C_{12}H_7 MO_{14}$

Acid Dimetallic Salt  $C_{12}H_6 M_2 O_{14}$

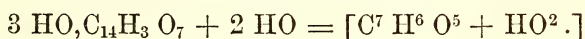
Neutral Trimetallic Salt  $C_{12}H_5 M_3 O_{14}$

Therefore we have the following decomposition occurring in the neutralization of citric acid by the volumetric solution of soda:—



Citric acid is frequently slightly tinged; this is due to the charring of the organic matter by the sulphuric acid employed in its manufacture, and from other causes.

#### *Acidum Gallicum.*



This is a tribasic acid. When pure it occurs in white acicular prisms, but is generally found in commerce more or less colored, (described in the Pharmacopœia as a pale fawn color). It dissolves in 100 parts of cold and 3 parts of boiling water. It is very soluble in alcohol, but less soluble in ether.

If we except the coloring matter, this acid is generally pure. The Pharmacopœia tests will meet every case—viz.,

“It leaves no residue when burned with free access of air. Its solution gives no precipitate with gelatine.”—*Medical Press, Dublin, May 31, 1865.*

crop of crystals the most impure when recrystallizing; he recommends dissolving the ordinary acid in sufficient water to give from 10 or 15 per cent. of the original weight employed, when crystallization has taken place these are to be rejected; mother liquors yield a purer crystal. This treatment may be repeated until oxalic acid is procured practically pure. The writer would recommend acidulating the liquor with nitric acid before the last recrystallization.



## NOTES ON THE CANTHARIDES OF THE ARGENTINE PROVINCES.\*

BY DR. HERMANN BURMEISTER.

The remarks of Don Camilo Giovanelli on the cantharides of this country, in the "Revista Farmacéutica," vol. iv. no. 3, p. 71, induce me to send you a more detailed notice of these insects, so useful in medicine, and so abundant on our soil, as also in all other warm countries.

Cantharides belong to a family of *Coleoptera Heteromera*, i. e., of that section of *Coleoptera* which have five joints in the four fore feet, and only four in the hind feet; and this family is easily distinguished from others of the same section by its soft body, less horny on the surface; as also by the form of the hind part of the head, and the cloven claws.

The celebrated Latreille, the first entomologist of his time, has called the family of cantharides "*Vesicifica*," alluding to the caustic property possessed by many (although not by all) of the species. This property seems to reside, not in the fluids, but in the solids of the body, and chiefly in the horny covering; and it is stronger in proportion as that covering is rougher and more metallic. On this account, the European cantharis is probably one of the most efficacious, for it is one of the most resplendent, in its golden-green metallic lustre.†

The family of the *Vesicifica* is divided into two principal sections, viz., *Meloides* and *Cantharides*. The former have no wings, and the elytra are usually short; but the latter have longer elytra, and are furnished with wings.

Amongst the *Meloides* there is one species, *Meloë Proscara-bæus*, which was at one time considered an antidote to hydrophobia. We have in this country only a single species of this section, viz., *Meloë miniaceo-maculatus*, figured in D'Orbigny's "Voyage to South America," (*Insect. tab. 15, fig. 6*). I have found this insect (which is easily recognized by the red spots on its small elytra) a few times in the interior of the province of Buenos Ayres. Another species, the *Meloë Klugii*, described

\* "Revista Farmacéutica" of Buenos Ayres, January, 1865.

† It may be observed, however, that *Mylabris Cichorii*, Fabr., which is devoid of metallic brilliancy, has vesicating powers quite equal to those of the common cantharis.—ED. P. H. J.

and figured by Brandt and Erichson, in the Transactions of the Acad. Cæsar. Leop. Car., vol. xvi. pl. i. p. 103, t. 8, is found in the Banda Oriental. I have myself collected, during my travels in the Argentine Provinces, two new species,—the one in Mendoza (*M. sanguinolentus*, nob.), the other in Catamarca, *M. ebeninuz*, nob.) These four species are hitherto only known to exist in this part of South America.

The *Cantharides* are far more numerous, not only in other countries, but also in the Argentine Republic. Entomologists divide them into various genera, of which I have met with the following in this country:—

1. *Horia maculata*, Fabr.—This lives with the great bees which make their nests in the trunks of vines, and are called *Mangangas* (*Xylocopa*). The beetle destroys the bee by eating up its food, and even the bee itself in the grub state. It is the largest of all our native cantharides, being above an inch long. It is of a yellow color, with black spots on the elytra.

2. *Tetraonyx*, Latr.—This has the body more robust—shorter and proportionally broader—than the other genera of the same family; it has also the antennæ less elongated and rather thicker; and the tarsi short, with broad triangular articulations. I have collected three Argentine species of this genus, one in Tucuman, two in Mendoza.

3. *Cantharis*, Latr. (*Lytta*, Fabr.)—Body longer or shorter, narrow; antennæ long, slender; feet elongated, with narrow slender articulations: these characters distinguish the true cantharides from allied genera. It is the most numerous group of all, containing above 100 species. I have collected in the Argentine Provinces up to this date eight species, of which only three were previously known. I shall confine myself to naming these three, which are:—

*Cantharis adspersa* (*Lytta adspersa*, Klug, *Nova Acad. C. L. C. Ac.* vol. xii. pl. 2, p. 434, t. 25).—It is this species which is known here as the *Bicho moro*, and is so abundant in our gardens, where it does great damage by eating seedling plants. I have found it also in the Banda Oriental, and in the province of Mendoza.

*Cantharis punctata* (*Lytta punctata*, Germar, *Spec. Insect.* Nov. i. 175, 287).—Very like the *Bicho moro*; but the elytra

are more strongly marked with black dots, and the feet are of the same brownish black as the rest of the body. I have found this in the Banda Oriental, and in Entre-Rios near the Paraná.

*Cantharis vittigera* (Pyrota vittigera, Bl., D'Orbigny, *Voy. Entom.* 200, t. 15, f. 7).—Collected on the Paraná.

The last of these three species is naked on the surface; the other two have a very fine brown pubescence, with naked points. The remaining species are clothed in the same way, except one very small one from the Banda Oriental, and another very large one from Catamarca and Mendoza, and probably along the whole western side of the Republic (La Rioja, San Juan) at the foot of the Cordillera. This species, which I call *Cantharis viridipennis*, is one of the largest of all, being nearly an inch long, of a black color, with yellow feet, and metallic-green elytra. It is probably also the most efficacious of the Argentine species, being the only one that has a metallic lustre, like the European species. The apothecaries of Mendoza employ it with very good effect.

4. *Nemognatha*, Illig.—This genus is easily distinguished by the prolongation of the lower mandible into a longish thread. I have one species, hitherto unknown, of a yellow color, with black antennæ and tibiæ, from the Paraná. I shall call it *N. nigricornis*.—*Lond. Pharm. Jour.*, April, 1865.

## A NEW METHOD FOR PREPARING BENZOIC ACID.

By MM. P. and E. DEPOULLX.

This process is founded on the transformation of phtalic into benzoic acid.

The division of phtalic acid into benzoic and carbonic acids was foreseen by Gerhardt; when he placed phtalic acid and naphthaline in the benzoic series, he considered that this acid was to benzoic acid what oxalic is to formic acid. (Gerhardt, "Chimie Organique," iii. 413).

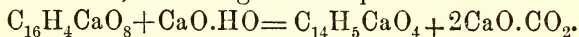
M. Berthelot (Chimie Organique Fondée sur la Synthèse, i. 348), speaking of the complete division of phtalic acid into benzine and carbonic acid, expresses himself thus in a note: "Were the decomposition arrested half way, benzoic acid would doubtless be produced."

M. Dusart has since, but without success, endeavored to effect this division; but by distilling a mixture of phthalate of soda, oxalate and lime, he has obtained, among other products, small quantities of hydride of benzoil, (*Comptes Rendus*, 1862, lv. 448).

We prepare phthalic acid by means of naphthaline, and we transform it into salt of lime.

We mix an equivalent of neutral phthalate of lime bicalcic phthalate, with an equivalent of hydrated lime, and maintain it for several hours at a temperature of from  $330^{\circ}$  to  $350^{\circ}$ , not allowing free access of the air.

The salt will then be entirely transformed into benzoate and carbonate of lime, according to the equation—



We extract the benzoate of lime by water, concentrate the liquids, and precipitate the benzoic acid.—*Chem. News*, (Lond.) May 26, 1865, from *Comptes Rendus*, ix.

#### ALLEGED POISONING BY OIL OF BITTER ALMONDS.

A case of poisoning near Maidstone, which we find reported in the *Chemist and Druggist*, deserves some notice as of interest to toxicologists. A lady purchased, it is said, some essential oil of bitter almonds to scent pomatum, made use of some for the purpose, and left the bottle on the kitchen table, some time, it would appear, before the servants' dinner hour. The exact hour is not stated, but we may presume it was before the middle of the day. Finding the bottle on the table, the cook took it up and tasted its contents. She stated that she merely put the bottle to her lips, but did not swallow any of the contents. It tasted bitter, and she ate a piece of bread to take the taste out of her mouth. She saw the deceased (a page boy, aged thirteen) take up the bottle and put it to his lips, and she took it away from him. The boy told her he did not swallow any of the contents. Shortly after this the servants had their dinner, and an hour afterwards the cook was taken ill, but the boy went about his work as usual. A medical man who was sent for found the cook unconscious; was told that she had swallowed some oil of bitter almonds, so he administered some brandy, and she soon rallied. At this time there was nothing the mat-



ter with the boy. The medical man, on leaving the house after attending to the cook, met the boy out with his master in the carriage. In the course of the evening the lad was taken ill, and the doctor was again sent for. He found the deceased insensible, almost pulseless, and his teeth so tightly closed that he had great difficulty in getting a piece of cork between them. Brandy was administered freely, but without success. He was carried up stairs about seven o'clock in the evening, and died at a quarter past eleven. At the inquest the medical man stated, "that he had no doubt the deceased died from the effects of having taken oil of almonds. If the boy had taken a larger quantity his stomach would have rejected it at once, and it might not then have got into his system. He should say the deceased and the cook must have taken a teaspoonful each." In the last words spoken by the boy he denied having swallowed any.

In a note to the report our contemporary says—"We have been informed that the poison was not genuine oil of almonds, but a factitious oil," and it must be quite clear to any one acquainted with the subject that the poison was not essential oil of bitter almonds. Everybody knows that the poison in this oil is prussic acid; and we believe we may state with truth that there is not a case on record in which the symptoms of poisoning by prussic acid have been delayed for the length of time which elapsed in this case. All the circumstances lead to the suspicion that the poison taken was *nitrobenzole*, the dangerous properties of which body are not sufficiently known. It may be, indeed, that this more dangerous poison was sold in innocence as oil of bitter almonds not containing prussic acid.

The case of this boy bears a considerable resemblance—so far, we ought to say, as we can gather from the report of the inquest—to the case of a lad who died from the effects of a few drops of *nitrobenzole* which he took by accident at a chemical manufactory. In that case four or five hours elapsed before the fatal symptoms came on, and the duration of the symptoms was about the same in each case.

In the interest of science we must hope that this case will receive further elucidation, both from the druggist who sold the poison and the medical man who attended the deceased.—*Chem. News*, (Lond.), May 26, 1865.

## RESINA JALAPÆ, P. B.

BY MR. A. F. HASELDEN.

Whilst preparing some resin of jalap according to the process set down in the British Pharmacopœia, several points occurred to me as seemingly worthy of consideration and inquiry. The mode of operating in the B. P. is exhaustion of the root by rectified spirit, the addition of a small quantity of water, the recovery of nearly all the spirit by distillation, the separation of the resin from the residual liquor, subsequent washing with hot water, and drying the resin with a gentle heat until it becomes brittle, breaking with a resinous fracture; and so far the process is all that is necessary in order to obtain the resin as described in the Pharmacopœia. The process might, however, have been carried further, and the brown resin thus obtained rendered colorless by digestion with animal charcoal, and thus have represented pure resin, or the jalapin of commerce. But I am far from certain that, therapeutically, the resin would have been improved. I think it quite possible that the animal charcoal does remove some of the acrid principle upon which the activity of jalap, as a cathartic, depends; and I am led to entertain this opinion from the fact that I have heard that jalapin does not act proportionately as well as good powdered jalap-root.

Now, amongst other things concerning jalap, Dr. Christison has stated that worm-eaten jalap is the best for the preparation of the resin. The late Dr. Pereira apparently entertained the same opinion, for, in his writings, he says jalap-root is apt to become worm eaten, the insects attacking the amylaceous portion, leaving the resin; hence worm-eaten jalap is to be preferred for the preparation of the resin. On the other hand, Duncan, Thornton, and Brande say that worm-eaten jalap should be rejected. I may probably be thought presuming when I state that I cannot entirely coincide with either side. Looking at the manner in which the resin is deposited in the roots, in irregular concentric rings, and sometimes seemingly pervading the whole mass, I could not conceive that these worms or insects could remove the amylaceous or extractive portion, and leave the resinous part untouched. I, therefore, proceeded to extract the resins from two portions of jalap-root, the one worm-eaten,

the other sound, as far as I could judge of the same quality in other respects—samples of them being upon the table—the worm-eaten gave me one ounce of resin from eight ounces, or 12.5 per cent., and afterwards, by boiling with water, one ounce of soft aqueous extract; the sound jalap yielded from the same quantity one ounce and a half of resin, nearly 19 per cent., and two ounces, or 25 per cent., of the aqueous product. Thus, though a wholesale manufacturer might use the worm-eaten for the preparation of resin, seeing that it would not command a ready sale as jalap-root for tincture, I should myself prefer the sound root. The next point of inquiry which suggested itself to me was one arising from the fact that the good Vera Cruz jalap being very dear, and another kind, described as Tampico jalap, being offered at a less price, the difference being one shilling and sixpence per pound, whether it would yield as good a product as the kind known as Vera Cruz jalap. It may be perhaps worth while to mention that Tampico is a port on the Gulf of Mexico, north of Vera Cruz, whence the jalap is exported, and from which circumstance it probably takes its name.

Operating upon the same quantity of this Tampico jalap, some of which is upon the table, I obtained exactly the same quantity of resin as I had done from the *sound* Vera Cruz, viz., 19 per cent., but only 10 per cent. of the aqueous extract. The next question which suggested itself was whether this and similar resins could be (following the Pharmacopœia directions) as well prepared with methylated as pure spirit? Judging from two samples on the table, I should say not. Although subjected to distillation, subsequent washing with hot water, and evaporation in an open vessel, these resins still most tenaciously retain the unpleasant methylic odor, but which is almost got rid of by subsequent digestion with a small quantity of pure spirit and animal charcoal, and repeated washings with hot distilled water.

There is yet another circumstance, I think, worthy of being mentioned in reference to a test for jalap resin. In the "Pharmaceutical Journal," vol. iv., 1st series, p. 326, writing upon jalap, Dr. G. Kayser says: "The relation of jalap resin to concentrated sulphuric acid furnishes us with the means of testing these resins. We have only to moisten a little of the powdered resin in question with a few drops of concentrated

sulphuric acid upon a watch-glass, and allow it to stand for a quarter of an hour. If it be pure jalap-resin it will be gradually dissolved, assuming a beautiful crimson color, and in a few hours a brown viscid resin will separate." He continues: "I have made the same experiment with common resin, *with scammony*, etc., but none of these evinced the characteristic relation towards concentrated sulphuric acid, which is, therefore, an infallible test for jalap resin." Here I am desirous of showing that, though the sulphuric acid test distinguishes jalap resin from some other resins, it does not distinguish it from that of scammony. It will be clearly observed from the watch-glasses upon the table—the one containing jalap resin, and the other scammony resin—that the rose color is so similar that it would be impossible to tell the one from the other. The inferences to be drawn from the foregoing appear to be:—

That the P. B. process for the preparation of jalap resin is good; that worm-eaten jalap certainly possesses no advantage over sound jalap, but rather the contrary, for the preparation of resin of jalap; that good Tampico jalap is a valuable substitute for the Vera Cruz; that methylated spirit is objectionable in the preparation of this and similar resins or extracts; and that concentrated sulphuric acid is not a distinguishing test between jalap and scammony resin.—*London Pharm. Jour.*, May, 1865.

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#### LIQUEFACTION OF PROTOXIDE OF NITROGEN.

One of the most interesting objects at a recent *soirée* at the Paris Observatory consisted in the exhibition of the liquefaction of laughing gas, the protoxide of nitrogen, by M. Bianchi. This took place at zero centigrade under a pressure of thirty atmospheres, the fluid issuing in a small jet from a strong metallic reservoir. Received in a glass tube, it retained its liquid condition by reason of the depression of temperature produced by evaporation, so that mercury being introduced solidified, and could be hammered like lead. Simultaneously, a body in the state of ignition, plunged into the atmosphere of the liquid, in which the mercury froze, burnt with a brilliant light. On pouring the protoxide into a small platinum capsule heated to redness,



the liquid was found to retain all its properties while assuming the spheroidal state, and was still able to freeze mercury contained in little glass ampullæ. Finally, the liquid protoxide became solidified under the recipient of an air-pump, the temperature being reduced to  $120^{\circ}$  below zero, Centigrade—the most intense cold yet obtained.—*Med. News*, Jan., 1865.

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THE ESTIMATION OF ALUMINA BY CARMINIC ACID, AND  
THE ACTION OF SOME REAGENTS ON CARMINATES.

By M. C. LUCKOW.

A solution of cochineal or carminic acid has the property of coloring carmine, a liquid containing alumina; when acidulated this liquid turns orange. The author has taken advantage of this reaction to make some analytical researches on alumina. The following are the results he has obtained. Carbonate of soda precipitates alumina imperfectly; in the presence of an ammoniacal salt the precipitation is more complete; with bicarbonate of soda instead of soda it is almost perfect. The more slowly the cold precipitation by carbonate of ammonia is effected, the more complete it is. The precipitate obtained with bicarbonate is less bulky than that obtained with neutral carbonates, and is consequently more easily washed.

The precipitation of alumina by carbonate of ammonia or ammonia is complete if the liquid is boiled until it returns to its neutral state. The filtered liquid does not give, with carminic acid, the reaction characteristic of alumina.

The cold precipitation by ammonia or by sulphide of ammonium is more complete the longer the time taken to effect it, and the smaller the excess of ammonia and the greater the excess of sulphide the better.

By passing a current of carbonic acid into a solution of alkaline alumina, the precipitation of this base is almost perfect.

By boiling an alkaline solution of alumina with chloride of ammonium until the reaction is no longer alkaline, the alumina is completely precipitated.

Alkaline carminates are soluble in water, very little so in alcohol; their solution is of a red violet color. Alkaline earthy

carminates are almost insoluble; the color of their solution is carmine red.

Carminates are decomposed by acids, giving an orange colored solution, which does not alter on boiling. The solution of carminate of alumina, such as is obtained by the addition of tincture of cochineal to a neutral solution of alumina, free from iron, has a beautiful carmine color, which turns to violet by contact with the air, especially when hot; if the solution be acid, this change does not take place; when the free acid is tartaric or citric acid, a red pulverulent deposit, formed probably of carminate of alumina, is, after a short time, obtained; this deposit is very little soluble in water, insoluble in alcohol, but soluble in acids and in alkalies.

Carminates of iron form precipitates of a dark violet (ferrous salts) or brown, (ferric salts), slightly soluble in water; strong acids, and also concentrated alkalies decompose them.

Carminates of zinc, nickel, cobalt, and manganese are almost insoluble; their color is carmine violet.

Salts of lead and copper are insoluble, and dark violet in color.

By adding a solution of cochineal to a stannous salt, a violet color is obtained, becoming dark carmine if the solution is shaken in the air, or, better still, with chlorine water.

Carminate of silver is unstable.—*Chem. News*, (Lond.), May, 5th, 1865.

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## DISCOVERY OF EMERY IN CHESTER, MASSACHUSETTS.

BY CHARLES T. JACKSON, M. D.,

Geologist and State Assayer.

It has been said, in England, that "a good mine of emery is worth more to a manufacturing people than many mines of gold." Such being the case, it affords me great pleasure to be able to announce the discovery of an inexhaustible bed of the best emery in the world in the middle of the State of Massachusetts, in Chester, Hampden county, quite near to the Western Railroad, which, with its ramifications, leads to the largest armories and manufactories of metallic articles in this and the adjacent States.

For more than two years, the existence of important beds of

magnetic iron ore, originally discovered by Dr. H. S. Lucas, has been known, and endeavors were made by that gentleman to organize a company for the purpose of smelting these ores. In consequence of this agitation, I was employed by John B. Taft, Esq., on the 19th of October, 1863, to examine the locality and to make report of my results to him.

On examination of my specimens of minerals, after returning to Boston, and my notes for sectional profiles of the rocky strata containing the iron ore, I found that the minerals, margarite and chloritoid, in talcose, hornblende, and mica slate rocks, indicated the occurrence of emery, the association of the rocks and minerals being identical with conditions known to exist in the localities of emery in Asia Minor.

I therefore called the attention of the owners of the property to these facts, and directed search to be made for emery, and that every mineral resembling it should be sent to me for examination. Little attention was paid to this prediction at the time, and not till I had invited Dr. Lucas, who resides in Chester, by personal representations and solicitations, to make the required search, the characters of emery being fully described to him.

On his return to Chester he soon learned that the miners were complaining of the great hardness of the supposed iron ore, and that no less than forty drills were dulled in boring a single hole for blasting. He then sent me pieces of this hard rock, in the belief that it was the emery I had predicted. On examination it was found to scratch quartz and topaz readily, and to have all the properties of emery; a chemical analysis proved it to be identical with the emery of Naxos.

The owners, resident in Boston, being notified of this discovery, went with me to the locality on the 11th of October last, when a full exploration of the premises was made. There are several large beds of rich magnetic iron ore at this locality, and the emery being magnetic (as it always is,) had caused it to be mistaken for magnetic iron ore, and many tons of it had been smelted with the carbonate of iron and hematite in the Berkshire county iron furnaces, without a suspicion, notwithstanding its refractory nature, that the ore was emery, with only a small admixture of iron ore.

The principal bed of emery is seen at the immediate base of the South Mountain, where it is four feet wide, and cuts through the mountain near its summit, at an angle of  $70^{\circ}$  inclination or dip to the eastward. Its course is N.  $20^{\circ}$  E., S.  $20^{\circ}$  W., and its known extent four miles. Near the summit of the mountain the bed expands to more than 10 feet in width, and in some places is even 17 feet wide.

The alternations of rock in two sections are as follows, beginning to the eastward:

1. *a*, Mica slate; *b*, 15 ft. soapstone or talcose rock; *c*, 2 ft. crystallized talc; *d*, talcose slate; *e*, 1 ft. granular quartz; *f*, chlorite slate; *g*, 4 ft. *Emery*; *h*, chloritoid and margarite; *i*, magnetic iron ore; *j*, hornblende rock highly crystalline.

2. *a*, Mica slate; *b*, 6 ft. magnetic iron ore; *c*, talcose slate; *d*,  $6\frac{1}{2}$  ft. magnetic iron ore; *e*, chlorite slate; *f*, hornblende rock, crystallized; *g*, 7 ft. *Emery*, chloritoid and margarite; *h*, magnetic iron ore; *i*, hornblende rock.

The elevation of the upper outcrop of this bed above the immediate base of the mountain is 750 feet. There are curious rounded masses of remarkably pure emery three feet in diameter in this bed, entirely invested with a coat of delicate rose-colored margarite, and a thick layer of bright green chloritoid, the investing coat being from half an inch to two inches in thickness. It is found extremely difficult to break up these masses of solid emery, drilling holes in them for blasting being very slow and laborious, and no grip can be had on their rounded sides by the sledge. A heavy drop hammer will be required to break them to pieces—or they may be cracked by fire, if heat does not injure the emery.

A branch of Westfield river separates the South from the North mountain, a hill nearly 750 feet high, through the summit of which the great emery bed also cuts. On this hill the emery is more largely crystalline, and less mixed with magnetic iron ore. It is more like corundum, but still contains the combined protoxyd of iron, characteristic of true emery. Its specific gravity is from 3.75 to 3.80, while that from the South mountain is from 4.02 to 4.37; Naxos emery being from 3.71 to 3.72, according to my trials of it, in comparison.

On the North mountain, three large beds of rich magnetic iron



ore, distinct from the ore accompanying the emery, occur, the ore yielding  $54\frac{1}{4}$  per cent. of metallic iron. This ore is mined, and is smelted into bar iron by forge fires, and is also sold to mix with the hematites and carbonates of iron worked at the Lenox and Stockbridge furnaces.

Digesting the South mountain emery in fine powder with nitro-muriatic acid and sulphuric acid for a long time, it was found that 73 per cent. of it was wholly insoluble in acids; and on microscopic examination the grains were seen to be translucent, and exactly like the Naxos emery prepared in the same way; but these translucent grains are readily taken up by the magnet. I therefore infer that protoxyd of iron is a chemical constituent of true emery.

Chemical analysis of the coarsely crystalline emery of the North Mountain, Chester. Sp. gr. 3.75. H.=9.

Alumina,	.	.	.	.	46.50
Protoxyd of iron,	.	.	.	.	44.00
Titanic acid,	.	.	.	.	5.00
Silica and loss,	.	.	.	.	4.50
					<hr/>
					100.00

Emery of the South hill.\* Sp. gr. 4.02. H.=9.

Alumina,	.	.	.	.	45.50
Protoxyd of iron,	.	.	.	.	43.00
Silica and titanic acid,	.	.	.	.	11.50
					<hr/>
					100.00

Regarding the oxyd of iron which can be dissolved out from emery by acids as accidental, and that which cannot be so removed as an essential constituent, we shall have for the composition of three samples of emery analysed, after digestion in acids,

	Chester, 1.	Chester, 2.	Naxos best selected emery.
Alumina,	60.4	59.05	62.3
Protoxyd iron,	39.6	40.95	37.7
			<hr/>
			100.0
			<hr/>
			100.0
			<hr/>
			100.0

\* The highest specific gravity of any sample from the South mountain was 4.3734.

If this view is adopted, emery must be ranked as a distinct species, and not as a mere granular form of corundum or sapphire.

In conclusion, I would state that practical trials of the Chester emery, in several of the large armories and machine shops of this and the adjoining States, have proved it to be fully equal in value to the well known emery of Naxos, which I have no doubt it will wholly supplant in this country, and that it will ere long become an article of export to Europe, either in its native form, or in a manufactured state.

It may be proper to add, that John B. Taft, Esq., of Boston, in behalf of his associates, owners of the emery mine, has the sole management of the business connected with the mine.

I would express my obligations to Mr. J. L. Smith for the valuable information contained in his articles on the emery of Asia Minor and on the associated minerals of the emery localities, published in vols. x. and xi. of this Journal. Also to Dr. H. S. Lucas, of Chester, for kind assistance in the field.

32 Somerset St., Boston, Dec. 12th, 1864.

*Amer. Journ. Science and Arts*, Jan., 1865.

## MAGNESIUM: ITS PREPARATION AND PROPERTIES.

BY EMERSON J. REYNOLDS, F.R.G.S.

Lecturer on Practical Chemistry, Ledwich School of Medicine and Surgery, Dublin.

Little more than five years have now elapsed since two distinguished chemists and physicists, Professors Bunsen and Roscoe, while engaged in some photo-chemical researches, observed the high refrangibility of the light emitted by burning magnesium-wire, and also its great "actinic" power; these observations led them to propose it as a convenient source of light for photographic purposes. It is but recently that any attempt has been made to utilize the valuable hint thus thrown out; this has not been due to apathy or neglect, but principally in consequence of the difficulties in the way of obtaining the metal in sufficient quantities for commercial purposes. The first steps toward the simplification of the manufacture of this metal we owe to the researches of Bunsen and Matthiessen; but to St.

Clair Deville and Caron is due the productive process at present in use in this country under a patent granted to Mr. Sonstadt, of Manchester, a gentleman to whom great praise must be awarded for the energy and perseverance with which he has overcome the difficulties which lay in the way of the preparation of magnesium on a large scale. At the present time, when so many are engaged in discussing the value and best modes of applying the magnesium light to photographic purposes, it may be of interest to give a succinct account of the preparation and properties of this remarkable metal in so far as they may be of interest to our readers.

The process of manufacturing magnesium may be most conveniently described as consisting of three stages:—1. The preparation of chloride of magnesium. 2. The reduction of the metal. And 3. Purification by distillation. Each of these operations will now be considered separately.

#### I.—*Preparation of Chloride of Magnesium.*

The manufacture of chloride of magnesium is far from being so simple as it would seem to be. It is true that it is very easy to obtain it in solution by dissolving magnesia, or its carbonate, as commonly sold, in hydrochloric acid; but if we evaporate this solution to dryness in order to obtain the salt in the solid state, we find that as the last portions of water are being given off they decompose some of the chloride, thereby reforming magnesia and setting free hydrochloric acid, consequently the residue left by evaporation contains a considerable amount of infusible magnesia. This difficulty, however, is well known to be overcome by the addition of either common salt or the chlorides of potassium or ammonium to the solution of chloride of magnesium; no decomposition, then, occurs on rapidly evaporating the solution to dryness, in consequence of the formation of a stable and fusible double chloride of magnesium with chloride of sodium, potassium, or ammonium, as the case may be. This fact has been taken advantage of by Deville and Caron and by Sonstadt.

Mr. Sonstadt, in the specification of his patent (dated November 8th, 1862), when describing his mode of manufacturing chloride of magnesium, lays particular stress on the necessity

for excluding all traces of sulphuric acid. The reason for particularity in this respect is, that the sodium used afterwards for reducing magnesium from the chloride would likewise take away oxygen from the sulphuric acid, thereby giving rise to the production of sulphides, which are found to materially hinder the aggregation of the small globules of reduced magnesium. Mr. Sonstadt preferably used chloride of potassium for adding to the solution of the chloride of magnesium prepared as already mentioned. The compound solution is then evaporated to dryness, and the solid residue placed in a platinum crucible of sufficient size; heat is then applied until the salt has perfectly melted, and any particles of infusible matter have had time to subside. The fused salt is poured out carefully on an iron plate; it quickly solidifies, and should then be broken up and preserved in stoppered bottles until required for use in the subsequent steps of the process.

Before leaving the consideration of the first part of the process, we may quote the following words from Mr. Sonstadt's specification, as they convey a hint to our readers regarding the selection of specimens of magnesium wire:—"When the material from which magnesium is to be prepared contains ammonium, in whatever state of combination, the metal obtained from it invariably contains nitrogen, the presence of which causes the magnesium to have a yellow color, and to tarnish rapidly in the atmosphere." It might be added to this that the regularity of combustion of even thin wire seems to be decidedly interfered with by the same circumstance.

## II.—*The Reduction of Magnesium from its Chloride.*

The magnesium now manufactured on the large scale is almost exclusively obtained by the action of metallic sodium on the chloride of magnesium; or, what amounts to the same, of the double salt previously referred to. There are, however, other modes of reducing the chloride, the most interesting and simple of which will be hereafter described. In order to obtain magnesium with the aid of sodium, one part of the latter, cut into small pieces, is placed in an iron crucible, and covered with five parts of the double chloride of magnesium and potassium; the cover of the crucible is now put on, and the temperature of the



whole rapidly raised to full redness. When the heat has been continued for a sufficient length of time, the crucible is allowed to cool, and when perfectly cold the cover is removed and the contents extracted. The mass is now quickly washed with water, which dissolves the saline matter, and leaves the reduced magnesium in the form of small globules more or less adherent to each other. The drying of the washed metal must be accomplished as rapidly as possible, at a temperature not higher than the boiling-point of water.

Another mode of producing magnesium has already been referred to. This consists in employing the decomposing power of the galvanic current. This mode of reducing magnesium was first successfully employed by Bunsen; but the following instructive and simple experiment is due to Matthiessen:—Take a common clay tobacco pipe with a bowl nearly globular in shape. In the cavity of the latter fuse some of the double chloride of magnesium and potassium over a gas flame. When the salt is fused pass up the pipe stem a fine iron wire, and allow it to project into the bowl, so as to have its point well below the surface of the fused salt. This wire should be connected with the negative pole of a battery of about six elements, the positive wire of which is terminated by a piece of gas coke which is made to just touch the surface of the fused mass. Decomposition at once commences, the result of which is the deposition of minute globules of metallic magnesium. This is a most interesting experiment, and one very easily performed without the least danger.

It must be recollected that the chloride of potassium present in the double salt plays but a mechanical part, and has not anything directly to do in the reduction of the metal.

### III.—*Purification of the Metal by Distillation.*

The purification of the metal by distillation is the most certain and effectual method which can be adopted, and the invention of the apparatus by means of which this object can be accomplished on the large scale in an atmosphere of hydrogen is due to the ingenuity of Mr. Sonstadt. We may mention that the manufacture of magnesium on the large scale, according to Mr. Sonstadt's patents, is now being extensively carried on by

Messrs. Mellor and Co., of Manchester. The last operation which magnesium has to undergo before it reaches the hands of the photographer consists in being formed into wire. Owing to the low degree of ductility possessed by magnesium this is a matter of considerable practical difficulty, as it cannot be easily drawn in the ordinary way into wire, but requires to be forced through small apertures into a steel block, the metal being kept at a heat below redness, at which point it is much more malleable than at ordinary temperatures. On this point, however, we can offer but little precise information, as the best mode of magnesium wire-making is kept secret. Magnesium, when pure, is a silver-white metal, of specific gravity of 1.75. It presents a crystalline structure, and is rather brittle. Its equivalent is 12. It exhibits much chemical analogy to zinc, but for certain reasons it is generally classed with the metals of the alkaline earths. It melts and volatilizes at nearly the same temperature as zinc. It does not easily oxidize in dry air, but if moisture be present it is rapidly covered with a film of hydrated oxide. It is quickly dissolved by diluted sulphuric acid with formation of Epsom salt. When thrown on a little very concentrated hydrochloric acid, it bursts into flame for an instant. It is not acted on by a mixture of concentrated nitric and sulphuric acids. It burns with great brilliancy when heated in the vapor of iodine and sulphur, but less brightly in that of bromine. It also burns in chlorine.

Professor Roscoe has estimated the expenditure of magnesium at ten grains for each portrait taken with the camera; but, even with the chemicals in good working order, this may be considered the minimum weight of metal required to be burnt. In conclusion, we may observe that the steady combustion of thick wires of magnesium may be materially facilitated by having the wire flattened out by passing between heavy rollers. This "ribbon" can be now purchased, and it burns more steadily and can be ignited more easily than the round wires at present in use.—*London Pharm. Jour.*, from *British Journal of Photography and Medical Press*.

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#### VALUATION OF ESSENCE OF MUSTARD.

Perfectly pure essence of mustard dissolves in concentrated sulphuric acid, with hardly any coloration; but the oils often

fraudulently adulterated all become colored, either red or brown, in presence of this acid.

To test the essence introduce five drops of it, with fifty drops of concentrated and colorless sulphuric acid, into a small tube, and then shake them together. The coloration will soon become apparent if the essence be adulterated.

Rectified petroleum forms the exception, as sulphuric acid does not color it, but its presence is betrayed by its insolubility in this acid. This may be proved by operating on twenty drops of essential oil; the essence of mustard dissolves, while the petroleum floats in the form of a limpid oil.—*Lond. Chem. News, March 24, 1865.*

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#### PREPARATION OF LIQUOR BISMUTHI.

To the Editor of the Pharmaceutical Journal:

SIR,—The process for the preparation of “Liquor Bismuthi,” which has appeared this month in your Journal, and which came under my notice some little time ago in the pages of the “Chemical News,” is similar in many important points to one which I have used successfully for more than a year; the latter resulted from a series of experiments suggested by the process of Mr. Tichbourne, which I, like Mr. Gray Bartlett, found impracticable.

Upon the appearance of the communication of the last-named gentleman, in the “Chemical News,” I tested the method there given. The results in my hands were not satisfactory, the quantity of precipitate formed being scanty in proportion to the weight of bismuth used, and a considerable portion proving quite insoluble in ammonia. I must acknowledge, however, my great obligations to that paper, from which I have largely drawn, since its appearance, for my own process; the proportions there given being almost universally adopted, as well as certain points of manipulation, which will be duly mentioned in the account to be given below. I have thus been enabled to attain for it a certainty and accuracy in which it was previously somewhat wanting, and which will, I hope, recommend it to such operative chemists as will give it a fair trial.

I had intended to reserve the following account for a paper, which I hoped to read before the Pharmaceutical Conference at

its next meeting; since, however, the subject has been brought prominently forward in your Journal, it will be more satisfactory that it should make its appearance there.

Take of Subcarbonate of Bismuth, 2 oz.

Citric Acid,  $1\frac{3}{4}$  oz.

Nitric Acid, 3 oz.

Water;

Solution of Potash;

Spirit of Wine,—of each what is sufficient.

Dissolve the bismuth in the nitric acid, add sufficient water to take up the nitrate precipitated (from two to three ounces); carefully avoiding excess. Dissolve the citric acid in the solution thus formed, (which will not be perfectly clear,) and add gradually solution of potash (Liquor Potassæ) until the mixture is only faintly acid, and gives, after filtration, but a slight cloud on the addition of more potash. Filter, collect the precipitate, wash slightly, (the presence of a trace of nitrate of ammonia in the product is of no consequence,) and transfer the precipitate to a dish; add solution of ammonia gradually, until the precipitate is dissolved (a little oxide will remain); filter. Measure 4 fluid drachms of the solution, add excess of sulphide of ammonium, collect the precipitate on a counterpoised filter, wash, dry, and weigh; 261 grains of the precipitate thus obtained represent 237 of oxide of bismuth. Dilute the whole of the solution with water and spirit of wine, in such proportions that a mixture of one part of spirit with seven of water shall contain the required number of grains (I generally prefer four,) to the drachm of solution. In the above process, it is especially necessary to avoid the addition of an excess of potash, which appears to decompose the citrate formed and precipitate an oxide insoluble in ammonia, and this appears indeed to take place to some extent previously to saturation; a slight waste is therefore incurred, by leaving the solution faintly acid, in order to avoid the formation of this insoluble precipitate.

The chief points in which I am indebted to Mr. Bartlett, in addition to those mentioned previously, are the following:—

1. The substitution of carbonate for nitrate of bismuth. The former is far more soluble than the latter, which was used by me in consequence of its supposed greater constancy of composition



2. The solution of the precipitate in pure ammonia. Before the appearance of Mr. Bartlett's communication, a mixture of citrate of ammonia with free ammonia was used, and heat was applied.

3. The highly important addition of a quantitative analysis. A margin was formerly left to allow for loss (which is not considerable) in the manufacture, and, as above stated, the nitrate of bismuth was used as a more uniform salt than the carbonate.

The weak points in Mr. Bartlett's process appear to be the following :—

1. The great acidity of the solution from which the citrate of bismuth is ultimately separated, causes the precipitation to be extremely imperfect; there is consequently great waste of material and labor.

2. The extreme dilution of each portion of the acid bismuth solution, in the act of addition to the solution of citrate of potash, seems to determine the precipitation of basic nitrate, insoluble in ammonia, before the double decomposition necessary to the formation of the citrate can take place.

I am, Sir, your obedient servant,

THOMAS P. BLUNT, F. C. S.

—*London Pharm. Jour.*, May, 1865.

#### THE PREPARATION OF HYPOCHLORITE OF SODA.

By substituting a solution of bicarbonate of soda for one of carbonate in the preparation of hypochlorite of soda, a precipitate of carbonate of lime is obtained in the form of a crystalline powder, depositing itself very easily, whilst, when a solution of ordinary carbonate of soda is employed, a kind of magma forms, which it is difficult to separate from the liquid by decantation. A small excess of bicarbonate of soda in the liquid is, as has been proved by experiment, very advantageous in some respects. With hypochlorite of soda thus prepared, hardly a minute is required to bleach any kind of engraving or printing without in the least degree damaging the paper, especially if it be immediately afterwards plunged for a few seconds in water in which a little acid sulphate of soda has been dissolved.—*Chem. News*, (Lond.), March 17, 1865, from *Journal de Pharmacie et de Chimie*.

## ON CHLOROFORM AND THE TESTS FOR ITS PURITY IN P. B.

BY D. R. BROWN.

Chloroform seems to have been first prepared by Graham,\* an American chemist, in 1831; but he was not aware of it. In 1820, Dr. Thomas Thomson gave the name of chloric ether to the compound known as Dutch liquid, the empirical formula of which is  $C_4H_4Cl_2$ . Somebody made a statement in Silliman's American Journal that a solution in alcohol of the so-called chloric ether was a grateful stimulant. It led Mr. Graham to attempt making it cheaply by the action of bleaching powder upon alcohol; and believing he had succeeded, he published his results, and gave a formula for its preparation in solution in alcohol. He was, however, under a mistake; what he did get was just an impure and somewhat weaker chloric ether of the present day,—that is to say, a solution of chloroform in alcohol, a solution of the compound  $C_2HCl_3$ , and not, as he supposed, of  $C_4H_4Cl_2$ .

Soubeyran, in 1831, distilled bleaching powder and alcohol together; examining the product, he discovered chloroform, and gave as its formula  $CHCl$  or  $C_4H_4Cl_4$ , and thus held it to be Thomson's chloric ether *plus* another double atom of  $Cl$ , and therefore named it bichloric ether.

In 1832 Liebig also discovered and examined chloroform. He failed, however, to find hydrogen in it. Not much to be wondered at, as  $119\frac{1}{2}$  grains contain no more than one of Hydrogen. The formula given by him was  $C_4Cl_5$ , and he named it chloride of carbon.

Dumas, in 1834, entered more carefully into its investigation, and as the result gave for its formula  $C_2HCl_3$ , and named it by its present well-known designation, Chloroform. Liebig, however, while he accepted Dumas's formula, held it to be the perchloride of the radical formulæ  $= C_2H + Cl_3$ , and so named it the perchloride of formulæ. We may notice here that a compound with the same name differently spelt, said to be  $C_4H_2Cl_4$ , is described in vol. ix. of Gmelin's Chemistry, pp. 199, 200, as "the so-called Perchloride of Formyl."

Since Dumas's investigation, and perhaps very properly following upon Professor Simpson's discovery, almost the whole

\* [This is an error; it should be Samuel Guthrie.—ED. A. J. PH.]

attention bestowed upon chloroform has been given to its anæsthetic properties, and its chemistry has been very nearly set aside. At this moment it has different names, and is variously formulated; its specific gravity is given by some as 1.484, and by others up to 1.500; the changes it undergoes by what we call spontaneous change, and by reagents, are either not at all or ill-understood, and the chemistry of its production from bleaching powder and alcohol, etc., is yet to be brought out. We need not wonder, therefore, that its characteristics and the tests given for its purity should be found somewhat amiss. The tests given in the British Pharmacopœia are four—1st, the specific gravity 1.496; 2d, “not colored by agitation with  $\text{S O}_3$ ”; 3d, it leaves after evaporation no residue and no unpleasant odor; 4th, “evolves no gas when potassium is dropped into it.” It is to the last of these that your attention is to be more particularly called, but a few words upon the others may be advantageous.

First, then, as to specific gravity. A perfectly pure chloroform will give a gravity of 1.500, and perhaps a very little above that; but for a commercial article, well and carefully manufactured, 1.496 is a perfectly fair standard. As it is sent out by manufacturers at present, we believe you will always find it to be from 1.498 to 1.500. Certainly anything below 1.496 ought to be held wrong. Here the editors of the “British Pharmacopœia” proceed upon a sound principle; eschewing that myth, “absolute chemical purity,” they allow a fair margin, and no more; but, as we shall see, it should have been allowed all through.

The second test, “not colored by agitation with  $\text{S O}_3$ ,” is unfortunately worded. An impure chloroform agitated with  $\text{S O}_3$  colors, and that deeply, the  $\text{S O}_3$ , while the chloroform itself is left colorless, or all but colorless. It may be almost certainly held that what is meant is, that when agitated with  $\text{S O}_3$ , it gives no color to the  $\text{S O}_3$ . “Colorless,” however, must be taken *cum grano salis*. A well-prepared chloroform will stand the test provided the search for color be made by transmitted light; but scarce any can be found which will not show a very faint tint in the  $\text{S O}_3$ , if a piece of white paper be put behind the tube. Moreover, the test requires precaution in its use. A somewhat

dirty tube; one cleaned with a woolly cloth, off which some fibres are left behind; the contact of the finger if employed to close the tube while agitating the fluids; or some organic substance accidentally present,—will all give more or less color to the acid. With the precautions mentioned, the  $S O_3$  test is a perfectly fair and most useful one. One other caution may be proper here, and that is, do not return the sample tested with  $S O_3$  to the stock; Chloroform twice treated with  $S O_3$ , Christison states, is likely to decompose.

The third, that it “leaves after evaporation no residue, and no unpleasant odor,” is, for the Pharmaceutical Chemist and the physician, the most important of them all; but it needs a few words regarding the olfactory part of it. It is only a very impure chloroform that will *leave*, in the ordinary sense of the word, any unpleasant odor after its evaporation; and sometimes it happens that what is left, is of a rather pleasant flavor. And again, when chloroform, containing only a minute quantity of those deleterious oils formed with itself in the process of its preparation, is left to evaporate from a clean cloth or vessel, it is only at the last moment their offensive smell is felt; and if the sense of smell is not delicate and on the closest watch, it will not discover the taint, for it passes off *instantly*.

We come now to the fourth test given; it “evolves no gas when potassium is dropped into it.”

About three weeks ago we got notice, from one of the most respectable houses in London, that the chloroform we had sent them did not stand the potassium test of the British Pharmacopœia. From the first we held the test to be inapplicable, and such as, with the specific gravity given in the British Pharmacopœia, ought not to be applied to it. We have the authority of Gregory and others that the specific gravity of pure chloroform is 1.500, and our own experiments assert the same thing. A specific gravity of 1.496, then, could only be the truth when the chloroform contained alcohol or water, or both; and to admit into the Pharmacopœia a chloroform containing those fluids, and then to apply a test for them, and reject the chloroform because they were present, seemed to us contradictory, and what could not have been the intention of the editors. We accordingly wrote our friends to the above purpose, and telling them



that we did not believe any commercial chloroform could or would stand the test. It was thought well, however, to examine the matter a little more closely.

A perfectly pure chloroform was very carefully prepared from alcohol by the process given in the B. P. Its specific gravity was 1.500; it gave no color to  $\text{SO}_3$ ; left no residue or odor of anything after evaporation, but it yielded gas with potassium. Specimens of chloroform were got from various makers, and others were prepared from acetone and methylated spirit, and one and all tried by the potassium test *gave off gas*. At first the evolution of the gas was rapid, but very soon became slower, and a white crust was formed on the metal. On removing that crust the gas was again rapidly produced. Sodium acted like potassium. The collection and examination of the gas presents a number of difficulties not very easily overcome: the use of water is out of the question; mercury is liable to explosive amalgamation with the K or Na; other fluids present other incompatibilities with the necessities of the case, and we can only manage well when our pneumatic trough is filled with chloroform; and that, being rather an expensive fluid to work with, gives off its own vapor with the gas, and so complicates the result.

The gas got by the action of Na on chloroform, and before washing it with water, burns with a yellow flame, somewhat smoky, and sometimes with a tint of green at the edges; and mixed with about its own bulk of air, and a light applied, it explodes with almost no violence, leaving sharp acrid acid fumes in the jar. A little water shaken with the vapor left in the jar after explosion is distinctly acid to litmus, and gives with  $\text{AgNO}_3$  abundant evidences of chlorine. On washing the gas with water some absorption takes place, and it then burns much more like Hydrogen, explodes more violently with air, and leaves less acid and chlorine in the jar. It is far too soon yet to say what the gas is or is not; so far as we have seen, however, it may be Hydrogen with the vapor of chloroform diffused through it, and due to water, or alcohol, in the chloroform. But an examination of the crust formed on the Na sets that aside, for it almost wholly consists of NaCl, which, under the circumstances, can only derive its chlorine from the decomposition of chloro-

form, or some other fluid containing chlorine mixed with the fluid called chloroform, as that is got by the B. P. and other processes. That last supposition is not likely to be the truth, but whether it be so or not it still leaves potassium inadmissible as a test; for whatever the fluid is, it is produced according to the given formula. Our belief, however, is that chloroform is one fluid, and that it is decomposed both by Potassium and Sodium.

How the error has arisen we cannot say, but the authors of the 'British Pharmacopœia' are not singular in their belief as to the non-evolution of gas from chloroform by the action of Potassium; for Liebig, as quoted in Gmelin, says that chloroform distilled over Potassium is not decomposed; and Heintz also, as quoted by Watts in his 'Dictionary of Chemistry,' states that chloroform is not decomposed by Sodium even when heated with it in a sealed tube to 200° Centigrade. In the experiment made before you, Sodium decomposes it at natural temperatures as you have seen, and so also does Potassium.

The only other matter worth mentioning is, that the crust formed on the Na is not wholly NaCl; it gives up something not yet examined to dry alcohol, and effervesces on the addition of HCl, and is strongly alkaline to litmus-paper. It is, when got of a grey color and in fine powder, soluble in water, giving a brown saline substance when again evaporated down. Heated to redness it is soluble in water, and leaves in the filter a small quantity of what looks like charcoal, and its solution effervesces more on the addition of acid than it did. These last facts point to the formation of an organic acid.—*London Pharm. Journal*, May, 1865.

## ON THE ELECTRICAL PROPERTIES OF PYROXYLIN PAPER AND GUN-COTTON.

BY PROF. J. JOHNSON.

(In a letter to Prof. SILLIMAN, dated Middletown, Conn., January 25, 1865.)

You did me the honor, a year ago, to publish in the *Journal* a note of mine on the electrical properties of *pyroxylin paper* and *gun-cotton*, adding an approving note of your own. Having lately had opportunity to make some further experiments with the same substances, I herewith send you the result.

It is proper to say that both the paper and the cotton were prepared nearly a year ago, and may have undergone some change, though nothing of the kind was apparent to the eye, except that one sheet of the paper used seemed at one place a little discolored.

The substances experimented with were *amber, sealing wax, sulphur, gum lac, pitch, rosin, caoutchouc* (native rubber), *hard rubber* (stick obtained of Messrs. J. F. Luhme & Co. of New York), *common vulcanized rubber* (as used in forming gas bags), *gutta percha*, and various crystallized mineral substances. But these last, becoming always positive, will not be further alluded to. The sulphur by friction with the gun-cotton always became positive, and also by friction with different sheets of the paper, except in a single instance, when using the paper which was slightly discolored, it appeared to be feebly negative. Rosin, pitch, gum lac and amber, both with the paper and the cotton, became always positive, as did also the native rubber, by which I mean the rubber as it is imported. Sealing-wax with the cotton becomes always positive, but with the paper occasionally negative. Vulcanized rubber (the kind used in making gas bags) would sometimes become positive and sometimes negative, and the same was true of gutta percha, two different specimens being used. The hard rubber (from Luhme & Co.) became always negative, both with the paper and the cotton. This being contrary to the results obtained by yourself with this substance, I made very many trials, but always with the same result.

In all cases after friction with other substances, whether the latter became positive or negative, the paper and cotton would be found invariably negative. Sheets of the paper, when handled, especially in cold, dry weather, often become highly excited,—always negatively, so far as has been determined; and my son informs me that sometimes, when handling considerable quantities of the recently prepared paper, he was even fearful that it might become ignited by the sparks produced!

I will just remark in closing, that in making experiments like these, great care is required in order that the result arrived at may be satisfactory. This is particularly the case when

it is necessary to rub a substance, as a roll of sulphur or a stick of sealing-wax, successively with different substances, some of which give the positive and others the negative electricity. Occasionally it will be found that the substance will be positive at some points and negative at others; and in such cases the only way is to lay the particular specimens aside until they shall have returned to their natural condition at all points. Sometimes a substance when first rubbed, after having remained undisturbed twenty-four hours or more, will take on one electricity, but, by continuing the friction a very little time, it will take on the other. Thus, a stick of sealing-wax in its natural state, when gently rubbed, *one or two strokes*, with a silk handkerchief, will often be found decidedly positive, but by a few strokes more it will become as decidedly negative; and it cannot be made positive again by friction with silk until allowed by repose first to return to its natural state. —*Am. Jour. Sci. and Arts*, May, 1865.

## ON TIN ORE AT DURANGO IN MEXICO.

BY PROF. C. F. CHANDLER.

I have recently examined a sample of 1450 grams of tin ore from Durango, and find it to be a handsome "wood tin" in pebbles and fibrous crusts, some of which are an inch in their longest diameter. The color varies from a very light brown to black.

Associated with the cassiterite, there are brilliant crystals of topaz, some of which are half an inch long. They vary from transparent to opaque, and from colorless to deep brown. I have not been able to examine them very closely, but have noticed the planes *O*, *I*,  $i\bar{2}$ , and 2. Owing to the development of the planes  $i\bar{2}$  and 2, and their rich brown color, some of the crystals might easily be mistaken for cassiterite.

The sample examined gave—

Tin (by crucible assay).	- - - -	50.90
Topaz crystals easily separated by the process,	-	3.10
Other topaz crystals, too small to be easily separated,	-	1.00(?)
Oxygen and impurities (by difference),	- -	45.00

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 100.00



The material used for the assay was very carefully averaged, by pulverizing about 500 grams of the ore, after the topaz crystals had been separated. A correction was subsequently made in the result of the assay corresponding to the quantity of topaz removed.

School of Mines, Columbia College, N. Y., Dec. 23.

—*Am. Jour. Sci. and Arts*, May, 1865.

## ON THE CITRINE OINTMENT OF THE BRITISH PHARMACOPŒIA.

BY M. DONOVAN, M.R.I.A., ETC.

There is no known formula for preparing citrine ointment which will always present the same appearance and possess the same properties, and a very short time is adequate to induce changes to a certain amount. This ointment may be viewed as a metallic soap mixed with that compound which Fourcroy designates oxygenized pomatum. Oxide of mercury, like other metallic oxides, forms a soap with the fatty acids. Berthollet produced such a compound by decomposing corrosive sublimate by means of solution of soap; but it was not permanent; in process of time it became slate-colored. A soap may be formed of an analogous constitution by heating finely-levigated peroxide of mercury with lard; but the soap thus produced undergoes the same changes as that of Berthollet, first becoming brown, and ultimately slate-colored. Hence, the ointment of red precipitate cannot be kept unchanged in the apothecary's shop. Citrine ointment is similarly acted on by time; if its color be ever so bright a yellow at first, it soon becomes dull, and by degrees tends to the same alterations as those already mentioned.

These changes are induced by the gradual decomposition of the mercurial nitrate and evolution of the oxide. If the decomposition be assisted by heat, the oxide is not only evolved but decomposed, and vapor of mercury is freely discharged.

Citrine ointment is of French origin. It was first introduced at the Hôtel Dieu where it was employed for the cure of itch—a disease which raged there ruthlessly at the time. The basis

of it was lard, with one pound of which an ounce of mercury dissolved in nitric acid was incorporated; it was found very effectual. This is the same formula that was introduced into the Dublin Pharmacopœia of 1807; but it was so hard that it could not be mixed with other ointments so as to be smooth, without the greatest trouble, and melting could not be used without changing its chemical constitution. With a view of remedying this defect, the Colleges introduced oil, forgetting that nitrate of mercury solidifies olive-oil, and renders it even hard. Changes in the ratio of nitric acid, in its strength, in the temperature at which the solution of the mercury was effected, and at which the solution was presented to the fatty matter, were made, but failed in attaining and preserving the qualities required.

I believe that the following is the theory of these changes. As there are two oxides of mercury, so there are two nitrates, which by certain agencies become basic. When mercury is dissolved in nitric acid in the ratio directed by the Colleges, the solution will be found to contain both the protoxide and peroxide, one or other predominating, according to the temperature at which the solution was effected. The two salts soon separate; the protonitrate crystallizes, the pernitrates remains in solution, retaining, however, a little of the former. If either of these nitrates, or its solution, be mixed gradually with water, its basic salt will sooner or later be precipitated: sooner, the less free acid it contains; later, as it contains much; but in every case the basic salt at length will be precipitated. If the protonitrate has been decomposed by a small quantity of water, the resulting basic salt will be white; if by a large quantity, yellow; if by a large quantity of boiling water, it will be bluish dark-grey. These degrees of color are due to the abstraction of successive quantities of acid. If pernitrates be decomposed by cold water, it affords an orange-brown salt; but according to Thenard and others, if much boiling water be used, the whole acid is washed away, and leaves pure red oxide.

Much the same series of changes may be observed when, instead of water, the mercurial nitrates are exposed to the action of the fatty acids; but owing to the considerable excess of strong nitric acid and the high temperature present, additional phenomena are induced. When the nitric acid holding the

mercurial salts in solution is mixed with the melted fatty matter, the chemical action induced is first to form Fourcroy's pomatum; the uncombined acid is withdrawn by decomposition, and the basic mercurial salts, which are now yellow, communicate that color to the ointment. But the decomposition of the basic salts does not stop here; the abstraction of nitric acid still slowly continues, until at length the mercurial salts are resolved into the two original oxides—slate-grey and orange-red—by the admixture of which colors an ointment of a brownish hue, lighter or deeper according to age and circumstances, will result. Heat will bring about these changes more rapidly; without heat a very long time will be required.

This series of changes took place in a remarkable manner when I repeated the process of the British Pharmacopœia for making citrine ointment. When the hot mercurial solution was poured into the hot lard and oil, and well stirred, an effervescence was excited which would soon have overflowed, but that the vessel was capable (as the Pharmacopœia directs) of containing six times the volume of the ointment. During this violent effervescence the color of the liquid ointment became continually darker, until, the effervescence having ceased, the ointment was found to be of a dark mahogany color. When perfectly cold, it did not solidify, but remained of the consistence of treacle, and might be poured from one vessel to another. The bottom of the basin in which it was made was found to be lined with a dark slate colored powder, which proved to be reduced mercury. In four months after, the ointment had attained the consistence of fresh butter in the hot days of summer.

Thus the process of the British Pharmacopœia is liable to failure. From all the experiments I have made, and they have been numerous, and varied according to the instructions of the three Colleges, I am led to believe that the degree of chemical action, as evidenced by the activity of the effervescence when the ingredients are mixed, is the main point to be attended to. If the ingredients be mixed cold, and the temperature maintained at a low degree, the ointment will be hard and of a pale yellow hue. If the ingredients be mixed very hot, and the temperature allowed to rise with the chemical action, the resulting ointment will be brown and too soft. Intermediate temper-

atures will produce intermediate colors and degrees of hardness; from impracticable solidity to absolute liquidity.

Besides color and consistence, there is another quality to be attended to. When the chemical action has been feeble, the ointment produced will be acrid and irritating, as well as hard and pale. A portion of this kind of ointment, which to the taste was very acrid when newly made, became in a few weeks much less so; in three months it was no longer acrid but metallic in taste. The frequent occurrence of this acidity induced surgeons to prescribe the ointment in a state of dilution with lard or other ointments, so that it is now almost never otherwise prescribed than diluted. Would it not be better to reduce the strength of the ointment in the formula of the Pharmacopœia to one-half, and thus put an end to the necessity of diluting it? The dilute citrine ointment, as directed in prescriptions, has no definite meaning as to strength, and the difficulty of preparing it is a continual source of annoyance to the apothecary.

I fear it is impracticable to obtain a citrine ointment which, at its first production, shall always present the same appearance and possess the same qualities by any process which does not carry into effect the following particulars, viz.: the temperature at which the mercurial solution and the fatty matters *respectively* are to be mixed, and, by art, *maintained*; the relative quantities of each of the ingredients, and the absolute quantity of the whole, which is not to be varied, for much depends on this. Were all this accomplished, the ointment would still be liable to subsequent changes, during which its medical effects must alter. So that it is probably hopeless to expect an unexceptionable process for obtaining a permanent ointment, containing nitrate of mercury in any of its forms. It might be supposed that the most prudent way to proceed would be to prepare only small quantities at a time; but here again we are met by the possible acidity of the new ointment. Dr. Duncan's process, from which he expected so much, does not obviate the difficulties in question.

A Dublin apothecary, nearly a century ago, acquired great fame for making a citrine ointment which remained apparently unchanged during a long time, and was soft from the beginning. It was known that the basis was butter. I have tried it, but found it acrid for a very long time.—*London Pharm. Journal*, April, 1865, from *Dublin Medical Press*.



## HARVARD UNIVERSITY HERBARIUM.

This establishment is noticed in the Annual Report of the President of the University to the Board of Overseers, made in January last, as follows :—

“Dr. Asa Gray has presented to the University his invaluable Herbarium and his Botanical Library ; which have been safely transferred to the fire-proof building furnished, at a cost of over twelve thousand dollars, by the generosity of Nathaniel Thayer, Esq., of Boston. A fund has also been raised by subscription, for the support and increase of the collection . . . The gift of Dr. Gray cannot be estimated in money, but it embraces the results of many years’ labor faithfully given by that distinguished botanist, aided by the generosity of his collaborators and correspondents in various parts of the world.”

The collections were formally presented by the following letter :—

“Botanic Garden, Cambridge, November 30, 1864.

“To the Rev. Dr. HILL, President of Harvard University :

“*My Dear Sir* :—I have the pleasure to inform you that the Herbarium and Botanical Library, which a year ago I offered to present to the University, are now safely deposited in the building erected for their reception by Mr. Thayer. I have regarded them as belonging to the University from the beginning of the present year ; but I wish more formally to make them over to the President and Fellows, as the foundation of the Harvard University Herbarium.

“The Herbarium is estimated to contain at least 200,000 specimens, and is constantly increasing. From the very large number of typical specimens it comprises, its safe preservation is very important.

“The Library, from the rough catalogue which has been made out, contains about 2200 botanical works—perhaps 1600 volumes, and nearly as many separate memoirs, tracts, &c.

“The current expenses of the establishment for the first half of the year now drawing to a close have been defrayed by Dr. Jacob Bigelow, who placed in my hands a special donation of two hundred dollars for this purpose.

“I had stated that the income of a capital sum of \$10,000

would be required to defray the current expenses of the Herbarium, i. e. for the purchase of certain collections and books not obtainable by exchange, for freights and charges, paper, alcohol, fuel, &c. I am informed that this sum, which Mr. George B. Emerson undertook to raise by subscription, is substantially secured. It is desirable, but probably not at this time practicable, that this endowment should be so far extended as to provide for the services of a Curator, so that I could myself devote valuable time to the prosecution of important botanical works for which I am prepared, and to which I am pledged.

“I have the honor to be, with great respect, very truly yours,  
ASA GRAY.”

We understand that extensive collections of botanical specimens, to be added to the herbarium, have recently accrued. Among them are—

A full suit of Mr. Charles Wright's collections, (about 2500 specimens,) made in Cuba during the past four years, and just now arranged and distributed among botanists.

A very interesting set of plants recently collected, chiefly by Professor Brewer, in the Geological Survey of California under Professor Whitney.

The numerous and important duplicate *Carices*, and other *Cyperaceæ*,) of the late Dr. Boott, presented by Mrs. Boott; the proper herbarium, set of *Carices* having been bequeathed to the herbarium of the Royal Gardens at Kew.

A large collection of plants of Mauritius and Madagascar, and a continuation of the distribution of the British East India herbaria of Griffith, Helfer, &c., presented by the directors of the Royal Botanical Gardens and Herbaria at Kew.

A similar distribution (in continuation) of plants of the Dutch East Indies and Japan, from the Royal Netherlands Herbarium, Leyden, now under the charge of Professor Miquel.

A selection from the Mexican collection of the late Professor Liebmann (Oaks, Ferns, *Cyperaceæ*, &c.); from the Royal Danish Botanic Garden, Copenhagen.

An extensive set of authentically determined plants of Persia, Siberia, and Northern China, from Professor Bunge of Dorpat; and of Algerian plants, &c., from Mr. Cosson.

A set of Mandon's plants of the Andes of Bolivia; acquired by purchase.

A fine general collection of *Algæ*, from Professor Agardh of Lund, authentically named, according to his new *Species Algarum*.

But the most notable accession is the munificent gift which has just been made by John A. Lowell, Esq., of all the botanical books of his own library which the new establishment did not already possess, being chiefly very large, choice, and costly works, such as the *Flora Danica*, Sibthorp's *Flora Græca*, Bate-man's *Orchidaceæ* of Guatemala, the *Botanical Register*, *Botanical Cabinet*, *Botanical Repository*, Richenback's *Icones*, the large edition of Duhamel, the great works of Jacquin, and others of the same character,—in all 335 volumes, the pecuniary value of which must be reckoned at several thousand dollars.—*Amer. Jour. Jour. Sci. and Arts*, March, 1865.

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#### THE EFFECTS OF THE CALABAR-BEAN AS AN ANTIDOTE TO POISONING BY ATROPIA.

In the ophthalmic department of the hospital at Prague last August, four boys, engaged in cleaning the room, drank a portion of a solution of atropia, thinking that it contained spirits. Two of the boys either spat out or vomited the fluid, and exhibited no symptoms of poisoning, but the two others who did not vomit were distinctly poisoned—one, however, much more so than the other. The symptoms were those of poisoning by belladonna, and consisting of delirium, dilatation of the pupils, feeble pulse, and in one there was coma, alternating with furious delirium. Both of the patients were taken to bed, one of them being restrained in a straight-jacket, and cold lotions were placed on their heads. Dr. Kleinwächter happened accidentally to have with him a solution of the Calabar-bean extract in glycerin, and by way of experiment, he gave to the patient who was the most affected ten drops of the solution (six grains of extract to one drachm of glycerine) which in about a quarter of an hour produced violent vomiting. The pulse became stronger and quicker, and rose to seventy-five and to eighty in the minute, the temperature of the body fell,

the delirium abated, the patient became more quiet, consciousness returned, urine was passed with some pain in the urethra, and the pupils become somewhat contracted. In the case of the other patient, who was less affected, some of the extract of the Calabar-bean was dropped into the eye, but without any good effect, for on the next day the symptoms were almost unchanged, while the patient who had taken the solution of the Calabar-bean internally, had almost completely recovered. The rapid and striking improvement in one of these cases appears manifestly to be attributable to the administration of the Calabar-bean extract, for the patient who was not treated in the same manner showed no improvement for forty-eight hours.—*Lond. Pharm. Journal*, from *Berliner Klinische Wochenschrift* and *British and Foreign Medico-Chirurgical Review*.

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#### THE AGASSIZ EXPEDITION TO SOUTH AMERICA.

On the 29th of March, Prof. Agassiz, with a large corps of assistants, sailed in the steamer Colorado for Rio Janeiro, on an exploring tour in South America. His corps consists of O. H. St. John and C. F. Hartt to collect fossils and to aid in geological exploration, J. G. Anthony to collect mollusks, J. A. Allen to collect birds and mammals, G. Scève to make skeletons of mammals, birds, the large reptiles and fishes, and Mr. Burkhardt to make drawings. Prof. Agassiz will devote himself, with native and such other assistance as he may obtain, to the collection of marine invertebrates, yet will have, for his main object, the study of the embryology of some of the remarkable fishes of the Amazon, and investigations with regard to the drift phenomena, or ancient glacial action, in the Andes.

The party is accompanied also by Dr. B. E. Cotting as surgeon, with the wives of Prof. Agassiz and Dr. Cotting, a son of Mr. N. Thayer of Boston, and a son of Mr. S. G. Ward of that city.

The expedition goes first to Rio Janeiro, whence the geological assistants will journey by land north to the Amazon, while the rest of the party, after completing investigations there, will take vessel for the same river. Prof. Agassiz and party will



then ascend the Amazon, to the Andes, and, finally, after explorations in the mountains, descend to Lima.

Professor Agassiz at first intended only a visit to Brazil for his health, and proposed to take along one or two assistants to aid him in making collections for the Museum of which he is Director at Cambridge. On mentioning his plan to Mr. Nathanael Thayer, this generous patron of science at once said "Agassiz, go home, find six assistants, and I will pay the bill." The Pacific Mail Steamship Co., hearing early of the projected tour of exploration, immediately tendered to Professor Agassiz and his wife free passage to Rio; and, afterward, on learning of Mr. Thayer's munificent proposition, Mr. McLane, in the name of the Director of the Company, offered to the whole party free passage in the new steamer Colorado, about sailing for Panama *via* Cape Horn. The arrangements were soon completed, and within three weeks after Mr. Thayer's promise was made, the expedition left New York in the Colorado.

The Secretary of the Navy has given Prof. Agassiz a letter addressed to all officers of the navy whom they may meet, in order to secure for them free transportation when desired. He offered also a government vessel to take them to their place of destination in South America, but they were already provided, through the liberality above mentioned. Every facility may be looked for also from the Emperor of Brazil, who has for some time past manifested great interest in the welfare of the Museum of Comparative Zoology at Cambridge.

Great results may be expected from an expedition under such a leader, so ably supported and so well equipped. The explorations will be mainly inland, and therefore the richer in novelties to science."—*Am. Jour. Sci. and Arts*, May, 1865.

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#### LIQUOR POTASSÆ AS A SOLVENT FOR GUM RESINS.

Solutions of gum resins in liq. potassæ recommend themselves for their elegance and economy, while they are generally very effective. For instance, a dilute solution of ammoniacum in water is perfectly clear, whereas a tincture produces an opaque mixture. The alkaline solutions of aloes, catechu, and kino are very cheap and elegant colouring matters, a few drops

giving a deep tint to half a pint of water. The quantity of liq. potassæ best adapted for each gum resin will be found to be as follows :—

Aloes.	.	.	.	1	part	to	15	liq. potassæ.
Ammoniacum	.	.	.	1	"		4	"
Assafoetida	.	.	.	1	"		10	"
Catechu	.	.	.	1	"		10	"
Guaiaicum	.	.	.	1	"		7	"
Opium	.	.	.	1	"		10	"

*Chem. News from Year Book of Pharmacy.*

## CORK AND ITS USES.

BY JOHN R. JACKSON.

Amongst the many materials or productions in use in every-day life, cork may certainly take a position in the foremost rank. We all know something of cork ; from our earliest childhood we have been familiar with it. It is a substance that has retained all its ancient uses, as well as its importance and value, from its earliest history down to our own day. Unlike most other things, it has not, even in this age of application and invention, found a rival. True it is we have "corky" substances in abundance, produced in almost every country ; but neither the productions of nature nor the productions of mechanical skill have produced an efficient substitute for cork, one that could take the place of this valuable bark, or even go side by side with it.

Considering the great quantity of cork that is consumed even in this country alone, as well as the great amount that is wasted, the quantity of bark annually stripped in the cork-forests is an operation of no little importance. The slight value many individuals place upon cork, on the whole, does not lead us in the least degree to estimate its real importance, which, in a commercial point of view, is of no trifling nature.

There must needs be a large quantity imported ; for amongst wine merchants, bottled-beer merchants, or soda-water makers, a cork is never used a second time ; but then what an immense bulk would go to make up a ton of cork, and yet it is by weight that the imports are estimated. There is an immense consump-

tion, and the demand of late years has almost exceeded the supply. The annual quantity imported into this country averages about 5000 tons.

Of the early history of cork, it is very clear that it was well known and in use amongst the Greeks and Romans. Theophrastus distinctly alludes to the fact, now so well known, that the continual barking of the trees tends to improve the quality of the cork. With the Greeks it was called "Phenos," while the Romans knew it by its present specific name of "Suber." Though cork was probably used in very remote times for similar purposes to those of the present day—that of stoppers for bottles amongst the rest—this, however, does not seem to have been its common or general use, inasmuch as we find that vessels of that period were frequently closed by earth, clay, and other similar substances. Stoppers of cork, or "corks," as we now call them, appear not to have been generally introduced till some time in the latter part of the sixteenth century; from that period, however, its use has been getting more and more universal in all parts of the world.

Before the introduction of cork, or its general adoption for bottle-stoppers, various articles were resorted to for this purpose. We are told that apothecaries secured the contents of their phials with stoppers made of wax, which must have been a somewhat tedious process. But even in our own day, a similar custom prevails in many parts of Europe; for with many of the Italians and Neapolitans, for instance, the practice of securing their wines, by pouring oil into the mouth of the bottle before tying it down with skin, is still very prevalent.

Before entering into the uses of cork, however, let us pay a short visit to the forests from whence it is obtained, and trace its progress from its natural position to that of its ultimate application.

Cork, as we all know, is the bark of a tree, though commercially miscalled "corkwood." It is produced by two species of oak, *Quercus suber*, L., and *Quercus occidentalis*, hence called the "cork-oaks." These trees grow abundantly in large forests in Spain, Italy, the South of France, and Northern Africa, the latter species being found alone on the Atlantic side. This

species is also peculiar, from the fact that it ripens its acorns in the second year.

In general appearance the cork-oaks differ little from the common oak, except, perhaps, that they do not attain to so large a size. There is also a slight difference in the form of their leaves—those of *Quercus suber*, L., being more lanceolate, and the margins not so deeply sinuate; the acorns are also somewhat longer and more tapering in form than those of the common oak.

The cork-oak does not require a rich soil; but, on the contrary, it seems to thrive best in poor and uncultivated ground. To collect the cork, incisions are made longitudinally and transversely in the bark of the living tree, the instrument used being a kind of axe, the handle of which terminates in a wedge-shaped form. After the bark is cut through, it is beaten to loosen it from the liber or inner bark, the wedge-shaped axe-handle being inserted to lift the bark from the trunk. The cork thus removed usually varies from three-quarters of an inch to three inches in thickness. The next operation is to divide it into pieces of a uniform or convenient size, and to flatten it, each piece having, of course, a similar curve, corresponding with the trunk of the tree from whence it was taken. For this purpose, the pieces are placed in pits and covered with water, and then pressed flat with heavy stones. The well known charred surface upon these cork slabs is caused by the application of heat at an open fire, after the steeping, for the purpose of contracting the pores. The pieces are afterwards bound up in bales, in which form they appear in the market. In removing the cork from its paternal trunk, care has to be taken not to injure the inner bark next the wood, else it would affect the second crop of bark, and perhaps injure the tree. This operation of stripping the bark, if dexterously and carefully performed, has, as we have already said, no detrimental effect, either upon the growth of the tree or the rapid formation of the new bark; but, on the contrary, the tree is said to grow more hardy and vigorously. The first crop of bark is usually taken when the tree is about twenty-five or thirty years old, but the crop is of less value than that of any succeeding gathering, as it is harder, very uneven, and more full of holes. The second gathering, however, which is in about



eight or ten years after the first, is still of an inferior quality. The third crop, collected in about eight years after the second, is usually the first marketable cork—that is, the first crop that is fit for cutting into bottle-corks. When the trees have attained to this age, so that three crops have been taken off, they usually yield a supply of good cork about every seven or eight years; and its quality improves, as well as the quantity enlarging, at each successive gathering. The season chosen for the cork harvest is usually the month of July or August.

It will be seen by the foregoing that the quality, and consequently the commercial value of cork is materially affected by soil, length of time allowed in growing, and also of care in collecting. There is as much difference existing in the quality of cork as in most other articles of daily use. The finest kind should be compact and firm, but at the same time not hard, of an even texture or grain, and of a slightly pinkish tint. This kind of cork is generally selected by wine merchants for bottle-corks; while the coarser kind, which is always more porous, full of small holes, and perhaps punctured by insects, serves for bungs for casks and for the various other applications to which cork is put in a cheap form. When cork is required to be thick, it is usually found coarse, as it must be allowed a longer period of growth to promote its thickness. The charring or singeing process to which this kind of bark is frequently subjected, for the purpose of filling up the pores and making it impervious to fluids, has also a detrimental effect, as it secretes an empyreumatic oil, which is given off and frequently taken up by the liquids it confines; but there is no doubt that care is taken in the selection of these corks, and methods adopted for the prevention of this chemical contamination, as much as possible. This operation of charring, to which all cork was formerly subjected for the purposes we have just mentioned, has been partially succeeded of late by that of boiling the cork and afterwards scraping the surface. This is said to improve rather than to deteriorate the cork, in being more effectual in filling up the pores.

The uses of cork are so numerous, and its applications so continually increasing, that the supply of late, as we have said before, has not been sufficient to meet the demand. It is not

our intention to enumerate all the uses to which this most useful article is put—indeed, it would be unnecessary to do so, so well known as they are to all; but there are a few modern uses or applications to which cork has been found suited in recent inventions, and which are, perhaps, among the “things not generally known;” but these uses chiefly consume waste or refuse cork, such cuttings as were formerly considered of no value.

The new elastic floor-cloth, now so well known as “Kamptulicon,” is a combination of caoutchouc and cork; and this is but one instance showing that cork, treated with other substances, can be made into a really useful article. Cork-dust has been used successfully with india-rubber in the process of vulcanizing, and to so fine a powder is it reduced for this purpose, that india-rubber so treated is capable of being moulded into the most delicate forms. Another recent application of cork is for stuffing beds, and we believe this is now done to a large extent.

A large Cork Company, lately established in London, and owning large forests in Portugal, have recently imported the virgin cork into this country, with the impression of its becoming useful for rustic garden-work. It is brought in very large pieces, and, from its rugged, uneven surface, which is frequently covered with lichens, together with its portability and its porous nature, which makes it capable of retaining moisture, will no doubt cause it to be used for such purposes.

Though the bark of the cork-tree contains a considerable amount of tannin, it is not in general favor among tanners, on account of its not imparting the required “bloom;” and for this reason it is seldom used alone, but is mixed with English oak bark. The inner bark is that which is used for tanning purposes, the outer bark being quite devoid of any of the required properties. The removal of the inner bark causes the death of the tree; and it is chiefly from Sardinia and some parts of Spain, where the trees are very abundant, that it is imported for this purpose. The quantity of tannin, as well as the color of the bark, varies much, according to the district from whence it is obtained. The Sardinian bark is thicker and of a deeper red color than any other.

To return to cork itself and its more common applications, we

find that there are two sorts or qualities known in commerce, called respectively white and black cork. The white, which is chiefly produced in the south of France, is the best, as it is smoother, of a more even and finer grain, and freer from holes and knots.

The operation of cork-cutting is one requiring great dexterity and neatness, and is carried on to a great extent both in France and England, though, as might be supposed, the French surpass the English in this art. Machinery has been tried for the purpose of cork-cutting, but all is now cut by hand. Considering the difficulty, with which we are all acquainted, of cutting a clean surface to cork, it is surprising to see the rapidity with which the workman turns out a perfect cork stopper from the little square pieces furnished to him. The knife used for this purpose has necessarily to be very sharp, as well as being very thin; the blade is broad, and when the edge has become dull, it is quickly sharpened on a very fine-grained stone. The bench or tube at which the workman sits has a ledge round it to prevent the corks falling off. On the Continent, a notch is made in the edge of the bench to place the back of the knife in, to prevent it from slipping. Thus the edge is uppermost, and the knife has to be guided slightly while the cork is pressed against the edge, and so dexterously turned and rounded to the required form. All the corks thus cut are thrown into a basket to be sorted, which is usually done by women and boys.

The great importance of cork as a commercial article has been the cause of experiments being tried for its introduction into the Southern States of North America. It is, however, some years since the American Government tried this plan of naturalization, for which purpose large quantities of the acorns were imported from the south of Europe. More recently, we learn, from Sir J. W. Hooker's last Report on the Royal Gardens, Kew, that steps are now being taken by the Colonial Government of South Australia to introduce the cork tree, and a number of young plants have been raised at Kew expressly for transmission to that colony.

We sincerely hope that these efforts to establish a tree furnishing so useful a product as cork, in a colony where it would

become a valuable addition to its commerce, as well as adding to the supply, which, at the present increasing rate of consumption, is much to be desired, may be crowned with success.—*Lon. Pharm. Journ.*, June, 1865, from *The Technologist*.

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#### WHAT IS AN INCH OF RAIN.

The last weekly return of the Registrar-General gives the following interesting information in respect to rain-fall:—"Rain fell in London to the amount of 0.43 inch, which is equivalent to 43 tons of rain per acre. The rain-fall during last week varied from 30 tons per acre in Edinburg to 215 tons per acre in Glasgow. An English acre consists of 6,272,640 square inches; and an inch deep of rain on an acre yields 6,272,640 cubic inches of water, which at 277.274 cubic inches to the gallon makes 22,622.5 gallons; and, as a gallon of distilled water weighs 10 lbs, the rain-fall on an acre is 226,225 lbs avoirdupois; but 2240 lbs are a ton, and consequently an inch deep of rain weighs 100.993 tons, or nearly 101 tons per acre. For every 100th of an inch a ton of water falls per acre." If any agriculturist were to try the experiment of distributing artificially that which nature so bountifully supplies, he would soon feel inclined to "rest and be thankful."—*Jour. Franklin Institute*, from the *Jour. of the Society of Arts*, No. 639.

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#### PRESENCE OF THE BENZOL SERIES IN CANADIAN PETROLEUM.

By C. SCHOLEMMER, Esq.

Pelouze and Cahours state that American petroleum which they used did not contain hydrocarbons of the benzol series, whilst I found a not inconsiderable quantity of these compounds in the rectified petroleum from which I isolated the hydrides of heptyl, &c. As it was not impossible that this was an accidental or intentional admixture, I endeavored to procure some genuine crude American petroleum, but I did not succeed in obtaining crude genuine Pennsylvanian, as none of it had reached the Liverpool markets for months. I, however, got some real Canadian



rock oil as a thick black liquid of a very unpleasant odor. I distilled it, and treated the portion boiling below  $150^{\circ}$  C. with concentrated nitric acid, which acted violently. The acid liquid was then diluted with water, and heavy liquid nitro-compounds separated, possessing the odor of bitter almonds. These were treated with tin and hydrochloric acid, and the solution thus obtained was distilled with caustic potash. The aqueous distillate, in which some drops of an oily liquor were suspended, had the odor of analine, and gave, with a solution of bleaching powder, the most distinct aniline reaction. The beautiful rosaniline reaction, could also easily be obtained by heating one of the oily drops with bichloride of mercury. Canadian petroleum contains, therefore, the series of benzol hydrocarbons. In the preparation of hydride of decatyl from rectified petroleum, the portion boiling between  $150^{\circ}$  and  $170^{\circ}$  was purified by nitric and sulphuric acids, and thus liquid and nitro-solid compounds obtained. The solid portion was several times recrystallized from alcohol and the whole of the needle-shaped crystals thus obtained gave, on analysis, numbers very nearly agreeing with the formula of trinitro cumol,  $C_9 H_9 (NO_2)_3$ .—*Chem. News*, London, June 2, 1865, from *Trans. Roy. Soc.*, v. xiv., p. 168.

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#### PHARMACOPŒIA OF INDIA.

For some months past, a proposition relative to a pharmacopœia for India has been under the consideration of the Secretary of State for India. The *Bengal Dispensatory* of 1842 and *Bengal Pharmacopœia* of 1844, both published at Calcutta under order of the Government, by Dr. W. B. O'Shaughnessy, have long been out of print, and copies of either work can only be obtained with difficulty. Meanwhile the study of medicine has made great progress among the natives of India, and graduates in medicine and surgery are constantly quitting the Presidency colleges of Calcutta, Madras, and Bombay, and establishing themselves in various towns of the empire. The European population is also upon the increase, and the attention of the intelligent classes is being directed more than ever to the development of the resources of that rich country.

Under these circumstances, the Indian Government has thought it advisable to authorize the publication of a work which shall afford to the medical men and pharmacutists of India information of the same character as that supplied by the pharmacopœias of Europe, but with particular regard to indigenous medicinal products.

The labor of preparing this work has been entrusted to Mr. Edward John Waring, F. R. C. S., Surgeon in Her Majesty's Indian Army, author of a *Manual of Practical Therapeutics*, and of numerous papers on Indian pharmacology, assisted by a committee consisting of the following gentlemen, viz., Sir J. Ranald Martin, Sir William Brooke, Drs. Thomas Thomson, Robert Wight, J. Forbes Watson, Alexander Gibson, and Mr. Daniel Hanbury. The first meeting of the committee was held at Cannon Row, Westminster, on the 15th March, after an interview with Lord Dufferin, the Under Secretary of State, at the India Office.—*Lond. Pharm. Jour.*, April, 1865.

[We are glad to hear of this project. The light thrown on the *materia medica* of the East Indies since 1844 has doubtless developed much that may be usefully introduced into a Pharmacopœia for that country, and through it made known elsewhere.—ED. AM. J. PH.]

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## NOTICE.

### American Pharmaceutical Association.

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The Thirteenth Annual Meeting of the American Pharmaceutical Association will be held in Boston, Mass, on Tuesday, Sept. 5, at 3 o'clock, P. M.

The objects of the Association are fully explained in Article 1st of the Constitution, and the conditions of membership in Article 2d.

It is hoped that the reports of the various Standing Committees will be ready for presentation at the first sitting; and all members who have accepted subjects for investigation are earnestly requested to have their papers ready, and, should they be unable to attend, to forward them to the President of the Association, care of S. M. Colcord, Boston.

W. J. M. GORDON, *President*.

*Cincinnati*, June 21, 1865.

## Editorial Department.

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MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION FOR 1865.—The period fixed for the convention of this body by its adjournment is on the 5th of September, 1865, at Boston. We have received the annual notice from President Gordon, which will be found at page 313. The earlier occurrence of the meeting, the interesting locality, and above all, the cessation of the war, are points favorable to the view that a large attendance will be present. The number of subjects allotted at the last meeting is small, hence it is desirable that members should bring as many volunteer papers as possible. Last year some of the best communications were of this class, and added much value to the "Proceedings." More than two months remain for action, and we invite all who feel interested in the advancement of the Association to prepare offerings, and take or send them to Boston. There are many occurrences in most pharmacies that invite an investigation, and are suggestive of subjects for papers. Such should be noted, and, if time or ability to make them be not at command, members would do well to bring them to the meeting in the form of queries. None of our meetings have been more interesting than those whereat subjects of general interest have been brought forward for discussion, as the "Sale of Poisons," "The Drug Law," etc. All present can take part in developing them, and often those who do not write are well qualified for this engagement. Let us then meet at Boston prepared by general consent to consider some of the new questions which have arisen, and are appealing for a solution to every druggist and pharmacist in the country: such as the burdensome and unjust bearing of the internal revenue laws upon the business of the pharmacist and druggist; the actual influence which the alcohol tax is producing on the quality of pharmaceutical preparations, and on the integrity of apothecaries, as custodians of the pharmacopoeial authority. The relation of the apothecary to the trade in liquors is a fruitful subject, and deserving of grave deliberation as to how far he is justified in selling liquors strictly for medicinal purposes, without requiring a license. Whether that part of the law of Congress could not be modified so as to admit apothecaries, who have no desire to extend their trade in these articles, so as to need a license, to furnish them on the occasional emergencies which all are liable to meet, without invading the law. Then again, the temptation to inebriation which this trade opens to young men and boys. We know one apothecary who takes out a license as "liquor dealer," which he finds is adequate to enable him to practice pharmacy, sell liquors, tobacco, or almost anything he pleases! What a commentary this is on the efforts of those who consider that pharmacy is a profession seriously bearing on the public health, and which should be encouraged and upheld by the authorities.

Yet another subject is the large number of Hospital Stewards thrown out of employment by the cessation of the war.

In visiting Boston, it is well to take a view of interesting objects on the route, and to vary this, going and coming. One course of special interest is that by the Hudson, taking West Point, Catskill, Lebanon Springs, &c., whilst the more direct routes, by Fall River, Stonington, etc., have their advantages. The apothecary deserves a vacation, and the hot weather of the first and second weeks of September afford a fitting season.

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ON THE INFLUENCE OF THE REVENUE LAW UPON THE PRACTICE OF PHARMACY.—The business or occupation of the apothecary, called practical pharmacy, is the art of preparing and dispensing medicines. Every true apothecary feels it a duty to be assured of the good quality of the medicines he dispenses. This he does by purchasing the drugs himself, in a condition to be judged as to quality, and then to convert them into medicines himself, that he may *know* their quality. To this end Colleges of Pharmacy have been established, to teach the art, as well as science of our business, and to render the apothecary a *maker* as well as a *vender* of medicines. The interest and welfare of the community is in unison with the encouragement of this idea, and Legislation should foster it, as one of the means conducive to public health. Is then the apothecary, who, in accordance with the requirements of the Pharmacopœia, and with his obligations to the medical profession, makes the medicines he dispenses, for the quality of which he is at least morally responsible,—is he a just subject of taxation as a manufacturer? This question has been brought home to some of our apothecaries by a circular from the U. S. Assessors, requiring them to render a monthly account of the sales of articles they manufacture, if the aggregate for one year exceeds \$600, excepting only those preparations which are proprietary, and carry a stamp. They are required to keep a record book, which will exhibit to the revenue officers the varied minutiae of their business so far as preparing medicines is concerned. It is also alleged that the tax on the *retail* manufacturer is laid upon his amount of sales at retail prices. This must be an error, as it is a discrimination against the apothecary as a manufacturer, he having certainly the right to manufacture for himself at the same rate that others manufacture for him,—that is to say, in reporting to the Assessor he is not bound to report higher prices than he could go into the market and buy the same quality of articles for, and by doing which he would avoid the tax altogether.

There are apothecaries who, in connection with their regular retail business, manufacture quantities more or less considerable of perfumery, mouth washes, tooth powders, syrups for the table, liquid rennet, etc., and some that make certain pharmaceutical preparations for other druggists, in quantities that render them liable as manufacturers. This class is few in number, and might properly be taxed in this connection; but to compel the regular dispenser of medicines to keep an account of the hundreds of petty



details of his shop laboratory, so as to exhibit results fit for a revenue collector to examine, is an imposition so onerous and burthensome in its execution as to be unworthy the character of a free government, and calculated to have a mischievous tendency in disgusting well disposed citizens with the whole scheme of collecting the revenue.

Every good citizen should cheerfully do his part towards upholding the national credit, by contributing his quota of taxation; but he should not submit to the unequal distribution of the burthen without a protest. The amount of ingenuity displayed by the Committee of Ways and Means in getting up the revenue laws was quite remarkable, but in the hands of the executive officers this ingenuity has blossomed and fructified nowhere so precociously as in its relations to those wants of the community served by the apothecary. The idea seems to have been adopted that, under the fear of sickness or death, any amount of taxation may be wrung out of the people through the apothecary. We are reminded by it of Satan's answer in reference to Job: "Skin for skin; yea, all that a man hath will he give for his life:" and there is more truth than fiction in the worldly policy that dictates it.

The influence of the immense impost on alcohol (\$4.00 per gallon,) reaches nearly every important class of preparations made by the apothecary, and yields of itself a sufficient revenue to be drawn from this branch of-business; but pharmacy has to carry, 1st, the duties on drugs, nearly all of which are imported; 2d, the right to carry on the business, by license; 3d, the right to sell brandy, whisky, and wine, for medicinal use, requires another license, although they are all official medicines; 4th, the stamp tax, which is a considerable item; 5th, the income tax,—and now, lastly, a manufacturer's tax! In a word, he pays a license for the right of carrying on the business, and is then taxed for doing it! Fortunately, most of these incongruities arise from the imperfect digestion of the revenue laws, and want of experience in the officials. We have recently had occasion to converse with one of the Assessors,—a man of intelligence,—who, while he does his duty to the government, is guided rather by the spirit than the letter of the law. He admits the practical difficulty of applying the rule to the legitimate apothecary, and believed that it would reach him solely where he stepped aside from his business of preparing and dispensing medicines for the sick.

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ST. LOUIS COLLEGE OF PHARMACY.—We have received from the authorities of this Institution, in pamphlet form, copies of its "Charter, Laws and Code of Ethics," and a prospectus of the first annual course of instruction in that College. We have already alluded to the reorganization of the St. Louis College of Pharmacy, and it is with great pleasure this tangible evidence of the progress of the work has been received. From a glance over the pamphlets it is quite evident that the authorities issuing them have approved of the general plan and code of ethics of our College and School,

as in many respects they are very similar. In the St. Louis School, however, they are in advance of us, having a chair of Botany—a feature not yet adopted into our School. The greater tendency to the use of vegetable remedies in the West, and the great variety of valuable indigenous plants that are found all over the country, render this Chair especially important. We hope Prof. Wadgymer will have a good class this season, and realize for the School and for himself substantial advantages.

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THE BRITISH MEDICAL COUNCIL, THE PHARMACY BILLS, AND THE BRITISH PHARMACOPŒIA.—Many of our readers are aware that for some time past the Chemists and Druggists of England and Wales on the one hand, and the Council of the Pharmaceutical Society of Great Britain on the other, have originated Parliamentary Bills for the better regulation of pharmacy, so as to register all persons who shall engage in the practice of pharmacy after January 1, 1866, intended to include that numerous class of dispensers who are outside of the Pharmaceutical Society. Pending the consideration of these Bills by the Committee of Parliament having them in charge, the attention of the Medical Council has been attracted to the subject, and, at their meeting held April 7th, appointed a committee, of which Dr. Henry W. Acland was *Chairman*. The committee, after considering both bills, prefers the mode of action suggested in the bill of the Pharmaceutical Society, as best calculated to attain the end in view,—viz., “to form a Register of legally qualified pharmaceutical chemists; to prohibit the use of certain pharmaceutic titles by persons not on the register; to confine to those registered the privilege of executing the prescriptions of medical practitioners, subject to the provisions hereinafter named; but not to restrict the sale of medicines asked for in any other manner.”

The Committee suggest certain additions to the Pharmacy Bill: 1. That it should apply to Ireland also; 2, that it should be rendered imperative on pharmaceutists to follow the British Pharmacopœia in compounding prescriptions, unless otherwise directed by the prescriber; 3, they think the terms of registration too easy; 4, they advise that a clause should be inserted in the bill prohibiting pharmaceutists of all grades from practising medicine or surgery, or any branch of medicine or surgery.

At the meeting of the Medical Council, April 13th, an extended discussion followed the reading of a resolution by Dr. Corrigan, to cause to be inserted in the Pharmacy Bill a clause to render it imperative on dispensers to follow the British Pharmacopœia, unless specially otherwise directed, which, in a modified form, the Council adopted so far as to send such recommendation to the Secretary of State.

On the 15th of April, the Pharmacopœia Committee reported to the Medical Council as follows:

“The Pharmacopœia Committee beg to report, that after much careful consideration they requested Mr. Warrington, of the Apothecaries’ Hall, and Dr. Redwood, of the Pharmaceutical Society, to undertake the prepa-

ration of the next edition of the Pharmacopœia, under the supervision of the Committee. The gentlemen named accepted the duty, and they are engaged actively in its performance. The Committee in the first instance prepared an outline of the subjects which seemed to them to require revision, and these subjects are made the basis of careful inquiries by Messrs. Warrington and Redwood, who have submitted and will continue to submit their reports thereon, together with such suggestions as they think proper to make, for the consideration and decision of the Committee. The Committee have also received valuable assistance from Dr. Farre, appointed by the English Branch Council, from Dr. Moore, appointed by the Irish Branch Council, and from Dr. Christison, appointed by the Scottish Branch Council, to report on the improvement in the progress of pharmacy; and they hope that the services of these gentlemen may be continued.

"Taking the first edition of the Pharmacopœia as a basis, compiled, as it has been, with great labor and expense, the Committee hope that, without making any very extensive or fundamental changes, the next edition will be found acceptable to the profession.

GEORGE BURROWS, M. D., *Chairman.*"

The report was adopted after some discussion, and it was hoped that it would be printed in time for submission to the next meeting of the Council.

This early revision of the British Pharmacopœia is caused by the numerous criticisms it has received at the hands of both physicians and pharmacutists; and in the hands of Mr. Warrington and Dr. Redwood, both practical men, we may look for many improvements.

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BRITISH PHARMACEUTICAL CONFERENCE.—This body will meet in September, in the city of Birmingham. The Pharmaceutical Journal for June contains a list of the subjects of queries which are expected to be answered on that occasion, about fifty in number. They are well gotten up, and, if answered in a manner equal to that of the last meeting, they will prove to be valuable contributions to the general stock. We look upon this enterprise as one of the best that has yet been undertaken for the advancement of British pharmacutists; it does not clash with the *Institutions*, and affords a stimulation to laudable ambition to excel in every department of pharmacy. May success attend it.

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*Resources of the Southern Fields and Forests; Medical, Economical and Agricultural: being also a Medical Botany of the Confederate States: with practical information on the useful properties of the trees, plants and shrubs.* By FRANCIS PEYRE PORCHER, Surgeon P. A. C. S. Prepared and published by order of the Surgeon-General, Richmond, Va. Charleston: 1863, pp. 601, octavo.

This volume, kindly sent to us by Mr. Edwin T. Robinson, of Richmond, Virginia, appears to have been compiled by the author to meet, as far as possible, the medical wants caused by the rigorous blockade during the



last two years of the Rebellion. The author remarks, "It is intended as a repertory of scientific and popular knowledge as regards the medicinal, economical and useful properties of trees, plants and shrubs found within the limits of the Confederate States, whether employed in the arts for manufacturing purposes, or in domestic economy to supply a present as well as a future want. Treating specially of our medicinal plants, and of the best substitutes for foreign articles of vegetable origin, my aim has been to spare no exertions compatible with the limits assigned me to make it applicable as well to the requirements of the surgeon as of the planter and farmer; and I trust that, after the war shall have ceased, there shall still be no diminution in the desire of every one to possess a source from whence his curiosity may be satisfied on matters pertaining to our useful plants."

The author has availed himself freely of the botanical and medical works of the United States published before the rebellion, as well as of the journals and Patent Office reports. The arrangement is that of the natural orders of plants, the author bringing in important subjects under the plant that most concerns them—as wine under the grape, sugar under sorghum, &c. For the purposes for which it was written a much smaller book, less technical and more practical, would probably have proved much more useful. As a memento of the extraordinary condition of the country requiring its publication this volume is interesting. It is well printed on tolerably good paper, and is altogether a creditable specimen of Confederate work. Not the least curious feature of the book is a pamphlet glued in the forepart, entitled, "Standard supply table of the indigenous remedies for field service and the sick in general hospitals, 1863," issued from the "Surgeon-General's Office," Richmond, Va., and signed "S. P. Moore, Surgeon-General C. S. A." The tables give the amounts of indigenous herbs, roots, barks, etc., required to serve 500 men for 12 months.

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*The Essentials of Materia Medica and Therapeutics.* By Alfred Baring Garrod, M. D., F. R. S., Prof. of Materia Medica at King's College, London, &c. &c. New York: William Wood & Co., 61 Walker St. 1865. Pp. 439, octavo. (From the publishers.)

This volume is the result of an attempt to select what the author deems to be the parts of materia medica and therapeutics most essential to the student and practitioner, to the exclusion of most of the bulky details which swell the size of the standard works, such as botanical and other scientific descriptions, references to authorities, pharmaceutical comments, etc. Books of this kind owe their usefulness in great measure to the accuracy and clearness with which facts are stated, by the careful use of terms expressing size, shape, color, odor, taste, measure, weight, specific gravity, solubility, volatility and composition by symbols. It is surprising how much advantage an author gains by attention to these points in



compressing knowledge into a small volume. Judged by this standard, Dr. Garrod's book compares well with any of its class that we have examined. The author is evidently master of his subject, and handles it very well. He gives a few pages of introductory comments on pharmaceutical preparations, weights and measures, then three-eighths of his space to inorganic substances, and the remainder to organic drugs and preparations, under the two heads, Vegetable Kingdom and Animal Kingdom. The arrangement is according to the natural system in each case, giving the preparations of each drug under its description, and though generally very brief, in some of the more important drugs, as cinchona, opium, digitalis, &c., more detail is permitted. The work is evidently intended more for the medical student and practitioner than for the pharmacist. The therapeutical part of the book, including the statement of doses, is brought under the same rule as the materia medica—most space and comment being given to the important drugs. On the whole, we believe this book is the best of its kind that has issued from the press, and will be found highly useful to the student and practitioner of medicine as well as to the apothecary. In passing through the American press several formulæ and a few notices of American drugs have been introduced, but many of value are omitted; nor has as much accuracy been exhibited as would have been desirable in some of them.

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#### OBITUARY.

THOMAS B. WILSON.—The scientific world has sustained a severe loss in the death of Dr. Thos. B. Wilson, the late President of the Academy of Natural Sciences, in this city, which took place on the 15th of March last, at his late residence in Newark, Delaware. Dr. Wilson, who was a native of Philadelphia, has for many years devoted himself to the encouragement and promotion of zoological science, especially in connection with the Academy of Natural Sciences, an institution which, mainly by his energy, ability and princely liberality, has been raised from comparative mediocrity to an equality with the leading kindred institutions of the Old World. The superb collection of Birds, which ranks as the third in importance in the world, and the invaluable Library of the Academy, are but a partial evidence of Dr. Wilson's unostentatious munificence. Every department of the institution bears his mark and will feel his loss. He has also contributed largely of late to the Entomological Society at Philadelphia. Although his residence had been removed to Newark, Delaware, half of his time was regularly spent in his native city and occupied with his favorite pursuits. It is difficult to estimate the value of such men to the cause of science, or the loss which a community sustains when their labors are cut short.—*Daily Evening Bulletin*, Philadelphia, March 21.

THE  
AMERICAN JOURNAL OF PHARMACY.

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SEPTEMBER, 1865.  
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ON VERATRUM VIRIDE.

BY CHARLES BULLOCK.

The sedative action of *Veratrum viride* has been so well attested by the experience of medical practitioners, that its therapeutical claims have been acknowledged by placing two preparations of the plant in the present Pharmacopœia of the United States. A number of examinations, to determine the chemical constituents of the root of *Veratrum viride*, have resulted in the isolation of an alkaloid which answered in general character to veratria.

The paper of Mr. G. J. Scattergood, read before the American Pharmaceutical Association in 1862, showed that the principle supposed to be veratria was associated with a resin possessing greater effect in reducing the force and frequency of the pulse than the alkaloid itself. Dr. Percy's experiments with a sample of purified commercial veratria, demonstrated that principle to possess less sedative action than the resin associated with the veratria of *Veratrum viride*. Mr. Scattergood found the resin precipitated from the tincture of *Veratrum viride* after treatment with ether, to possess sedative action to a remarkable degree. As the subject is open to farther investigation, the following notes of an examination of the root may perhaps add something to the sum of our information regarding its active constituents.

Profiting by the experience of former investigators, the following process was adopted for procuring the active principle of the plant:

A fluid extract was prepared according to the formula adopted in the last edition of the U. S. Pharmacopœia, viz., thirty-two

troyounces of the root in powder moistened with twelve fluid-ounces of alcohol, was introduced into a percolator, and alcohol gradually poured upon it until a pint of tincture had passed. This was set aside, and the percolation continued until five pints more of tincture were obtained. This was distilled to one pint and mixed with the reserved tincture.

To the fluid extract (which was slightly acid to test paper) sufficient acetic acid was added to give a distinct acid reaction, and the extract poured into one-half gallon of water with constant agitation. The mixture was allowed to stand for twenty-four hours, when the resin was collected on a cloth filter. After distilling the alcohol from the solution, evaporation was continued until it was reduced to one pint; it was then filtered through paper to separate the remaining resin, two ounces of alcohol added, and carbonate of soda to decided alkaline reaction. The addition of alcohol was found advantageous in preventing the precipitation of coloring matter with the impure principles. On adding the carbonate of soda to slight alkaline reaction the solution became dark and opaque, farther addition of the carbonate of soda increased the precipitation, and the solution assumed a clear wine-red color.

The precipitate was collected on a filter, washed slightly, dried, dissolved in alcohol and digested with purified animal charcoal. The alcoholic solution left, on evaporation, a dark brown resin; this residue was dried and treated with water acidulated with sulphuric acid, using a gentle heat to promote the solution. On cooling, the solution became turbid and deposited a flocculent precipitate, which proved to be chiefly coloring matter. When cold, the solution was filtered, and precipitated by carbonate of soda. The precipitate was collected on a filter and washed till the filtrate passed without color, when it was again dissolved in water acidulated with sulphuric acid and digested with animal charcoal on a water bath.

[On adding to a portion of this slightly acid solution in a test tube an equal volume of alcohol, to ascertain if any lime salt was present from the charcoal, of the purity of which I was not confident, the solution became very turbid, and, on warming, deposited a copious precipitate. Examination of the clear fluid,



after removing it from the precipitate, showed it to be almost entirely free from organic salts ; the precipitate contained nearly the whole of the alkaloids with the lime salts. This phenomena I have not seen noticed *in the books*, and may prove important in investigations for vegetable principles.]

The solution of the sulphates was again precipitated with carbonate of soda, the precipitate washed to remove the excess of alkaline carbonates, and dried on a water bath at a moderate heat. The product thus obtained represented the basic principles of veratrum viride mixed with some lime salts. To effect a farther purification, the product was reduced to powder and agitated with successive portions of ether free from alcohol. The ether left on evaporation a light yellow residue, weighing 9.2 grains ; it had no disposition to assume a crystalline form, and detached itself from the glass capsule in scales resembling tannin.

The portion insoluble in ether was then treated with alcohol of 95 per cent. The product from the alcohol weighed 15.7 grains ; it was semi-resinous in character, and of a light buff color.

Both products still retaining some color, a portion of each was dissolved separately in alcohol, and digested with animal charcoal, this treatment failing to decolorize them ; the alcohol was evaporated and the residue dissolved in acidulated water, filtered, a small amount of alcohol added, and precipitation effected by very dilute ammonia. Both precipitates, (which were now colorless), were collected on paper, well washed, and dried. The product soluble in ether dried to a soft pulverulent condition ; the other assumed a hard semi-resinous form, adhering to the filter.

*Examination of the products.*—The alcoholic solutions of both principles restored the color of reddened litmus paper. They are slightly bitter to the taste, and dissolve freely in dilute sulphuric, nitric, hydrochloric and acetic acids. The product soluble in ether is powerfully sternutatory, the other much less so.\* An alcoholic solution of the two principles dropped on

\* Half a grain of powdered opium, used as a snuff, quiets in a few minutes the excessive irritation of the mucous membrane of the nose.



glass sides and examined under the microscope showed no disposition to crystallize, but dried to an amorphous powder. Both are soluble in alcohol, amylic alcohol and chloroform. Neither of them, after drying, dissolve in benzole. [Mr. J. G. Richardson found the product soluble in ether to dissolve in benzole immediately after separation from its acid combination, a property which characterizes other alkaloids—as, for instance, morphia and strychnia, in Sta's method for the detection of the poisonous alkaloids, where ether is used as the solvent.]

*Alkalies and Alkaline Carbonates* precipitate both alkaloids from their solutions; the precipitate is insoluble in an excess of the precipitant.

The precipitates are flocculent and, when examined from time to time during twenty-four hours under an 8-10th object glass, showed no disposition to assume a crystalline form.

*Bicarbonate of Soda*—does not precipitate a slightly acid solution, even when added to distinct alkaline reaction. Heating determines the precipitation.

*Sulphocyanide of Potassium*—no precipitate in dilute solutions of either principle.

*Perchloride of Gold*—a precipitate with both.

*Iodo-hydrargyrate of Potassium*—a copious white precipitate in both solutions.

When treated with concentrated sulphuric acid, both alkaloids give nearly the same reaction, viz., dissolving to a reddish yellow color, which changes to ochry red, then to reddish brown, and finally becoming brown. [Veratria changes from light yellow to bright blood red, then crimson, which latter color lasts for some hours.]

The solutions of the alkaloids in sulphuric acid, treated according to Erdmann's method of color testing,—with sulphuric acid containing a trace of nitric acid, and afterwards adding a fragment of binoxide of manganese,—comported themselves differently from veratria: varying but little from the action of sulphuric acid alone.

*In Nitric Acid*—both dissolved to colorless solutions, showing after a few minutes a faint and evanescent rose tinge. This reaction was not, however, very decided.

*In strong Hydrochloric Acid*—both dissolved in the cold to faint yellow solutions; boiling deepened the color. After standing twenty-four hours, the solutions assumed a turbid greenish color.

[Veratria, as was shown by Trapp in 1863, dissolves to a colorless solution in cold hydrochloric acid; when boiled it assumes a red color, that finally becomes intense, resembling that of permanganate of potassa.] This reaction is very sensitive, even with the impure veratria of commerce,—the color remaining with little change in a closed test tube, after the lapse of ten days.

*Fusibility.*—The alkaloid soluble in ether fused at  $270^{\circ}$  to  $275^{\circ}$  F.; the other at  $335^{\circ}$  to  $340^{\circ}$  F. [Veratria, according to Soubeiran, fuses at  $115^{\circ}$  C., =  $239^{\circ}$  F.]

The therapeutical effects of the two products have been so fully described by G. J. Scattergood, that a confirmation of them seems to be unnecessary. What was described by him as a resin, my experiments tend to show is a distinct base; and to which Mr. S. ascribes much more potency in its effects upon the circulatory system, than to the alkaloid isolated by himself and others. The reactions of both these principles with sulphuric acid, carefully repeated, and with hydrochloric acid, tend to the belief that neither of them is veratria, properly considered, although this, and the deportment with other reagents, show a close connexion between them. Whether the product insoluble in ether is analogous in like manner to *veratrin*, I am unable to inform myself, as I know of no account of the deportment of that principle with reagents.

The experiments of Dr. S. R. Percy (Chemical News, Aug. 20, 1864,) differed from my own in some particulars, so important, especially regarding the precipitated alkaloid assuming a crystalline form after some hours, that I repeated the trial under different forms, using different precipitating solutions,—as potassa, carbonate of potassa, and ammonia,—but always with the same result, as before stated.

The resinous matter precipitated by pouring the fluid extract into water, I have set aside for a future examination.

*Philada., Aug. 15, 1865.*

## REMARKS ON SOME PREPARATIONS OF THE U. S. PHARMACOPŒIA OF 1860. (FERRUM.)

BY WILLIAM PROCTER, JR.

[(Continued from p. 406, vol. xiii.)]

*Ferri Chloridum.*—Perhaps no one of the new formulæ of the Pharmacopœia was more called for by the progress of therapeutics than that for this salt. Its frequent prescription in a solid form to make extemporaneous solutions and syrups of chloride of iron renders it necessary to have a salt that will dissolve wholly in water, and this want the officinal chloride completely satisfies, being the duodecimal hydrate  $\text{Fe}_2 \text{Cl}_3 + 12\text{HO}$ . In examining specimens of the commercial salt, it is occasionally met with in a condition unfit for effecting solutions, without filtration; due to the effect of heat in evaporation, a portion of the chloride being decomposed, and sesquioxide or subchloride remaining.

The process of the Pharmacopœia is modelled after that of Wittstein. Two equivalents of iron are dissolved in two equivalents of hydrochloric acid to obtain two equivalents of neutral protochloride of iron in the filtered solution; one equivalent of hydrochloric acid is then added to supply an equivalent of chlorine; the mixture being now raised to the boiling point is converted into sesquichloride by the action of the nitric acid, which, in supplying oxygen to the hydrogen of the hydrochloric acid, liberates its chlorine under circumstances favorable for union with the chloride of iron to form sesquichloride. The next step in the process is the isolation of the salt from the excess of water: this is effected by a gentle sand-bath heat, until the contents of the capsule, which should be previously tared, weighs "eight troy ounces and three hundred and sixty grains," when eight troy ounces of hydrochloric acid are used to act on the iron. It is then removed from the bath and set aside, covered with a bell glass for several days in a dry place, until the whole becomes a solid crystalline mass, in the form of mammillary concretions of crystals. This should be kept in well-stopped bottles, of the size suited to dispensing purposes.

In directing the evaporation to a specified weight, it is on the basis of the acid being of Pharmacopœia strength, sp. gr. 1.16.



It is quite necessary to evaporate the solution at a moderate temperature, and it is safest to protect the surface of the capsule above the evaporating solution from direct heat, lest a part of the salt adhering to it be decomposed. The entire solubility of the chloride in cold water is a test of its correct preparation as regards heat.

Chloride of iron is most convenient for making the several solutions and the *syrup of chloride of iron*. The latter is a preparation of French origin, and is obtained by dissolving a drachm of the salt in twenty-three drachms of simple syrup. The British Pharmacopœia "solution of perchloride of iron" is a dense solution of sesquichloride of iron mixed with some protochloride and subsesquichloride, containing theoretically  $87\frac{1}{2}$  grains of metallic iron to the fluid ounce,—equal to 421 grains of the sesquichloride, but practically it is less concentrated. When prescribed, it may be imitated by taking 7 drachms (420 grains) of the crystalline chloride, put it in a graduated measure, and add water, carefully, stirring with a glass rod, until it measures a fluid ounce. About 246 minims of water are required; of course it is more economical to prepare the solution directly by the British process, if needed, in sufficient quantity.

*Tinctura Ferri Chloridi*.—The formula now in the Pharmacopœia is that recommended by Dr. Squibb. (See Amer. Journ. Pharm., vol. xxix. p. 289.) The solution of chloride of iron is obtained as has been spoken of under chloride of iron. An excess of a fluid ounce of muriatic acid is used in this case, however, intended partially for its therapeutic qualities, and partially to avoid the presence of subchloride. When a deficiency of nitric acid is used, a portion of protochloride remains unconverted. This by the gradual action of the air is changed, and affords a deposit. When well made, this tincture keeps without deposition of subchloride.

*Pilulæ Ferri Carbonatis. Vallet's Mass.*—This formula is precisely as it was in 1850. Various pharmacutists have tried to vary the proportion of sugar and honey so as to get a less hygroscopic mass. The prevailing opinion is in favor of reversing the proportions, using two troy ounces of honey to three troy



ounces of powdered sugar. As this change does not affect the integrity of the preparation, and renders the pills much less prone to soften, it is a justifiable deviation from the official rule.

*Liquor Ferri Nitratis*.—In this formula the nitric acid is added to the iron in excess, so as to get nitrate of the protoxide. In the previous edition, the iron was added to the acid in excess until the latter was saturated, avoiding the full oxidation of the iron by controlling the temperature, a mixture of nitrates resulting. The latter was found to be ineligible, and, in the same hands, to afford variable results. The former yields a constant preparation when the reaction is properly controlled so as to avoid the formation of nitrous vapors in the solution of the iron. For further reasons, consult the original paper, Amer. Journ. Pharm., July, 1857, p. 306.

*Liquor Ferri Tersulphatis*.—So much has been written and printed in this Journal relative to this solution, (see vols. xxv. and xxxii.) that but a short reference is required in this notice. Instead of giving the ingredients and process for the tersulphate under each formula requiring its use, as in previous editions, a distinct formula has been given for the solution. The only caution that occurs to mention is one that applies to the inexperienced or careless. It will be observed that a fixed quantity of nitric acid is directed. If, as is very frequently true, the nitric acid is weaker than sp. gr. 1.42, there will be insufficient to peroxidize all the iron, and, as a consequence, the solution will contain some protoxide, which will cause a greater or less tendency to blackness in the color of the oxide it affords on the addition of ammonia. Now an expert, knowing the necessity of the full complement of acid, would increase the quantity, or continue to add it afterwards, until a drop caused no effervescence. The novice should therefore assure himself that all is right by testing a few drops, diluted with water, by adding an excess of ammonia, and if, instead of a reddish-brown precipitate, it affords one of a bluish-black or blackish-brown color, he should then add more nitric acid, as stated above.

*Liquor Ferri Subsulphatis. Monsel's Solution*.—It is unfor-

tunate that this preparation was originally introduced through the journals under the name "persulphate of iron," which was much used to indicate the tersulphate. The late Dr. Bache suggested and strongly advocated the name "*Liquor Ferri Sulphatis Astringens*" for Monsel's Solution, but gave up his preference in favor of the present name, which is strictly correct, the salt being a subsulphate of the sesquioxide of iron  $2\text{Fe}^2\text{O}^3, \frac{1}{2}\text{SO}^3$ . It is quite important in this preparation to use sufficient nitric acid to peroxidize the iron, but it is of far greater importance that *too much* should not be used, as its presence gives an irritating quality to the liquid, not intended; hence the direction to boil until nitrous vapors cease to be perceptible. The commercial solution when opened often evolves the odor of nitrous acid, which shows it to be faulty.

It would have been well had the dry salt of Monsel been introduced, as many surgeons, especially those in California, use it in the solid form for hæmorrhages. The salt is obtained easily from the solution by evaporation to a thicker syrup, spreading on glass and drying in a warm place, and, while yet warm, scaling it off with a spatula sharpened on one side. It should be bottled immediately and kept closed. In this state it is hydrated and soluble quickly in water; but when too much heated, the anhydrous salt is obtained, which dissolves more slowly, and is less efficient in dangerous cases of hæmorrhage where instant action is needed. Some physicians are in the habit of prescribing a given weight of the solid salt, to be dissolved in water, in a mixture, for internal use, or as a lotion. It would save much trouble if the prescriber would recollect that a fluid drachm of the U. S. P. solution contains very nearly forty grains of the anhydrous subsulphate, and that he will be better and more quickly served by diluting this than by dissolving the solid salt, which varies much in character. The apothecary, by recollecting that each minim represents two-thirds of a grain of the dry salt, may easily use the officinal solution in such cases.

*Liquor Ferri Citratis*.—This is one of the useful preparations of the Pharmacopœia, being used as the ferric basis of the formulæ for the *citrate*, *ammonia citrate* and *quinia citrate* of

iron, besides its great convenience for use in dispensing citrate of iron in mixtures, every two minims representing a grain of that salt. Moreover, it has the merit of keeping perfectly well, as the writer, who claims to have originated it as a pharmaceutical preparation, used it for the purposes intended for more than fifteen years, and has kept a specimen more than ten years unchanged. It will be observed that no note accompanies this formula in the Pharmacopœia indicative of its qualities or tests, and it is proposed to supply this deficiency in the following commentary.

Citrate of iron, when wanted in the form of this solution, is prepared by satisfying the solvent power of citric acid, in solution, with hydrated sesquioxide of iron, at the temperature of 150° Fahr., filtering and evaporating at the same temperature, until a pint of the cold solution is obtained from  $5\frac{3}{4}$  troy ounces of crystallized citric acid. The required quantity of hydrated oxide is obtained when a pint of solution of tersulphate of iron is mixed with two pints of water, and about ten fluid ounces of commercial aqua ammoniæ added, or until the ammonia is in slight excess, as denoted by its odor.

The hydrated oxide should be thoroughly washed, by percolating it with water on a filter or strainer, to remove the sulphate of ammonia. When drained, the oxide required in the Pharmacopœia recipe weighs about thirty troy ounces. Add the citric acid in powder to a half of the precipitate, contained in a suitable porcelain capsule, heated by a water-bath to 150° F., and stir them until the oxide is nearly dissolved; then continue to add the hydrated oxide, which floats on the solution, until the acid is satisfied and saturated; but the solution is not neutral to litmus, its composition being  $\text{Fe}_2\text{O}_3$ ,  $\overline{\text{Ci}}$ . The solution is now filtered, the washings of the capsule being used to wash the filter, and the clear liquid then evaporated at 150° F., by a water-bath, to the measure of a pint, or, if the capsule has been tared, until it weighs  $21\frac{1}{4}$  troy ounces. This weight, however, is liable to a slight variation, but perhaps less than would occur in measurement by ordinary graduated measures. Thus prepared, solution of citrate of iron has a dark ruby-red color when held up to the light; its taste is slightly ferruginous and decidedly acid; its



odor slight but not marked ; its specific gravity is 1·350 at 60° F., and each minim contains half a troy grain of dry citrate of iron.

*Ferri Citras* results from the spontaneous evaporation of the officinal solution spread on glass, but its consistence is too thin to retain its position on the glass when spread, and hence the officinal direction to evaporate to a syrupy consistence before spreading. The solution soon scales, in a dry atmosphere, after spreading on glass. This form of citrate, although really quite soluble, as is manifest from its suffering evaporation to dryness without separation from water, yet it offers considerable resistance to cold water. This insolubility is more apparent than real, and it is overcome at the ordinary temperature by time, and much more quickly by a heat of 150° Fahr.

*Ferri et Ammonie Citras*.—This formula is greatly simplified, being a simple mixture of solution of citrate of iron with aqua ammonia, (U. S. P.)—which neutralizes the acidity of the solution—evaporated to a syrup and spread on glass. This salt is much more soluble than the simple citrate, and even attracts moisture in a damp atmosphere ; hence it is called “soluble citrate of iron.” It should be borne in mind that this salt will not do to make “Liquor Ferri Citratis” when the latter is to be used for making other preparations, as citrate of iron and quinia, citrate of iron and strychnia, etc., yet under some circumstances, in the absence of the officinal solution, it may be justifiable to make an extemporaneous solution, making a slight allowance for the weight of the ammonia present of about one-ninth, the ammonio-citrate being that much weaker in citrate of iron.

*Ferri et Quinice Citras*.—This formula affords a salt containing theoretically three parts of the alkaloid quinia and twenty parts of citrate of iron. Originally the sulphuric acid of the sulphate of quinia employed was replaced by citric acid, but in revising the process this was deemed needless, as in the case of the ammonio-citrate. Much stress has been laid upon the color of this salt. When made with a large proportion of quinia, the scales have a greenish cast, and this is apparent in the U. S. Pharmacopœia proportions when the scales are thin. The salt of the British Pharmacopœia contains citrates of both oxides of iron



and about one-sixth of pure quinia; our own salt contains between a seventh and an eighth, with citrate of peroxide only.

*Ferri Lactas*.—The commercial process for lactate of iron involves the use of old cheese and sour milk, which would have to have been put in the official list if that process had been rendered official. The committee avoided this dilemma by placing lactic acid in the list, and, in the process for lactate of iron, directing the salt to be made from this acid and iron filings. The great expense of the pure acid of course renders the official process ineligible, as the salt it would yield would cost six times the price of the commercial salt, and be but little better. The description of the official salt in crystalline crusts or grains very rarely applies to the commercial salt, which is in a dusty powder, more or less greyish-white in color. The process usually employed is that in which the lactic acid is derived from sour whey, or this mixed with glucose and chalk, so as to get lactate of lime, from which the acid is separated by sulphuric acid, used in equivalent proportions. Obtained in this way, the acid may be used in a dilute and partially purified state for saturation with iron filings, and hence the economy of the process.

*Ferri Pyrophosphas*.—This formula is based upon that proposed by Dr. E. R. Squibb, (see vol. xxxii. p. 37, of this Journal,) and is a good one. The merit of this preparation is not only its tastelessness and solubility, but it is stated to be less stimulating to the heart than other preparations of iron. The quantity of iron is liable to vary, and this salt and its color varies in shade, with want of care in its preparation. The very precise directions of Dr. Squibb, before referred to, will afford all the information needed to the inexperienced operator.

*Ferri Sulphas Exsiccata* has, very properly, been reintroduced.

*Ferrum Redactum*, the new name for iron by hydrogen, is better than the old name *Pulvis Ferri*, which conveyed no correct idea of the preparation, applying as well to levigated iron as to reduced iron. On the other hand, the hypercritic may assert that all ordinary iron is made by reduction, although a different agent is employed. The name *Ferrum per Hydrogene* would probably be less exceptionable, yet usage has given a special meaning to

the term *redactum* in this connection; and it being also adopted in the British Pharmacopœia, is on the whole the best name.

*Ferri et Ammoniac Tartras*, although new to the Pharmacopœia, has long been known in American pharmacy. The formula is precisely that of the original recipe by the writer of this notice, published in vol. xii. p. 276, of this Journal.

*Ferri et Ammonia Sulphas*, or ammonia-iron alum, is made with the greatest readiness by the officinal recipe, if the solution of tersulphate be of the strength of the Pharmacopœia.

The formula for *Sulphate*, *Subcarbonate*, *Phosphate*, *Ferrocyanide* and *Hydrated Oxide*, and Tartrate of Potassa and Iron, are not materially changed, the three latter, being simplified by making the solution of tersulphate a distinct preparation, which is one of the greatest improvements of the revision.

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#### GLEANINGS FROM THE FRENCH JOURNALS.

BY THE EDITOR.

*Ferruginous Syrup of Cinchona*.—MM. Mayet and Lefort have reported to the Society of Pharmacy at Paris the results of an examination of the subject as to the best manner of combining iron and cinchona in a syrup; and the paper will be found at page 37 in the July number (1865) of the *Journal de Pharm.* They started with the question, which is the better salt of iron for avoiding the inky coloration of the syrup,—the tartrate, the citrate, or the pyrophosphate of sesqui-oxide of iron? They also kept in view the effect of binoxalate of potassa in destroying the color of tannate of iron, and queried whether citric acid acted in the same way, in preventing the coloration of the syrup. After a thorough investigation they arrived at the following conclusions:

1st. That the addition of citric acid in a mixture of syrup of cinchona and ammoniated citrate of iron, does not oppose the reaction of the tannin on the iron.

2d. That the citric acid retains the ferrotannic principle of the syrup completely in solution.

3d. That in the ferruginous syrup of cinchona, prepared with the acid citrate of sesqui-oxide of iron, there is an important

modification of the salt of iron and the production of a small quantity of salt of the protoxide in proportion as the syrup gets older.

4th. That this new syrup possesses a taste altogether different from that of the syrup of the simple citrate, and a composition varying with the epoch of its preparation.

5th. That to obtain a ferruginous syrup of cinchona in which the iron and cinchona will be only mixed, without reacting chemically upon each other, it is preferable to use a syrup of cinchona made with Malaga wine, in place of the aqueous syrup of cinchona.—*Jour. de Pharm.*, July, 1865.

The authors find the ammonio-citrate of iron, with excess of citric acid, to be preferable to the simple citrate with excess of acid, and has less tendency to blacken the syrup. That the inky taste so disagreeable in compounds of astringents with iron salts, is due to the formation gradually of proto salt of iron by the reduction of the sesqui oxide, and that it is more marked in old preparations than in those that are recent. In this country the preference is given in some cases to the soluble pyrophosphate, and in others to the acid citrate.

*To detect the presence of alcohol in small quantity.* By M. Carstanjin.—The liquid to be assayed is mixed with a portion of platinum black in a little flask, heated to 124° F., agitated well, and filtered. To the filtrate a few drops of liquor potassæ is added, and evaporated to dryness on a water bath. The residue, mixed with a little arsenious acid, is submitted to heat. If alcohol is present, cacodyl is produced, recognizable by its garlic odor. M. Nickles suggests that propylic alcohol will also yield cacodylic products by this treatment.—*Jour. de Ph.*, July, 1865.

*Culture of Opium in Upper Egypt.*—Prof. Gastinel, occupying a position under the Egyptian Government, has addressed a letter to the President of the Society of Pharmacy at Paris, relative to the culture of opium in Egypt. M. Gastinel, as a member of the Acclimatation Society of France, had turned his attention to this culture, and concluded to make some experiments, with a view to determine whether the low grade of Egyptian opium was due to climate and mode of culture, or to



adulteration. In two successive years he tried first the white poppy, and then the purple variety. The seeds of the white poppy were sown in a piece of ground well manured, in December, 1862; in April, 1863, when the capsules were near maturity, they were treated by incision in the usual mode, and the juice collected and inspissated to the ordinary degree. This opium yielded 10 per cent. of morphia, well characterized by usual tests. The second year's product of white poppy afforded 10.40 per cent. of morphia; and the opium from the purple poppy yielded 12.20 per cent., in great purity. M. Gastinel is therefore of the opinion that this branch of agricultural production in Egypt could be ameliorated so as to produce opium equal to that of Smyrna, and recommends that some influence be used to bring about this important change.—*Jour. de Pharm.*, Juin, 1865.

*On the poison of mushrooms.*—MM. Sicard and Schoras, (*Jour. de Pharm.*, Juin, 1865,) in a memoir on this subject, have arrived at the following conclusions :

1st. That the poisonous principle that exists in many species of mushrooms ought to be regarded as an alkaloid, as it unites with acids and forms salts.

2d. This salt, obtained by the process described in their paper, is extremely poisonous. The employment of an indefinitely small quantity, in the authors' experience, was always mortal to frogs. A small quantity also was sufficient to kill a dog; and it is remarkable that the effects exercised upon the animal organism by this substance are the same as those observed in latter times from *curarin*.

*On the ergot of the "diss."* By M. Lallemant.—The *diss* of the Arabs, which bears this new ergot, is *Ampelodesmos tenax* of Linck. This ergot was first found in 1842, at Calle, in Algeria, by M. Durian, of Maisonnèue, member of the Scientific Commission to Algeria; but it was not until 1860 that M. Lallemant, to whom M. Durando had made it known, studied this mushroom. The ergot of the *diss* is from 3 to 9 millimeters ( $\frac{1}{8}$  to  $\frac{1}{3}$  of an inch,) long, and 2 to  $2\frac{1}{2}$  millimeters thick. It is nearly quadrangular, a little flattened, rarely cylindrical, blunt at one end and sharp at the other, having nearly always a ridge



on the ventral surface; generally recurved or contorted, and of a blackish, or chestnut ash color. This last color due to the dessication of a part of the seed; light reddish when spoiled; its fracture is dry and angular, of a dirty yellow color presenting sometimes in the centre, arborizations very often badly defined, its odor nearly null, its taste peculiar, animalized, is insensible to tincture of iodine, burns with flame, assumes a red color, which browns and blackens afterwards, and evolves during combustion a strongly penetrating animalized odor.

The ergot of diss keeps very well. The following substances were obtained from it by analysis: *fatty oil* and *crystalline fat*, 30·6; *ergotine* of wiggers 2·3; vegetable albumen 3·6; sugar, gum, and nitrogenous matter 7; *fungin* 50·20; salts of lime and silica 6·20.

M. Lallemand has experimented at the clinics of the civil hospital during a year with the preparations of diss ergot, and his trials have always been crowned with complete success, with a dose one-half less than that of ergot of rye; and it is probable that, if generally known, this ergot would soon be employed in practice.

It is during the flowering season that ergotization occurs. This phenomenon has been studied with much care by M. Tulasne.—*Jour. de Ph.*, Juin, 1865, from *Gaz. Med. de Algerie*.

*Clarification of the Mississippi water.*—A writer quoted in *Bouchardat's Repertoire*, speaking of the earthy sediment in this water, says that the most successful method of clarifying it for drinking is by means of an emulsion of almonds, (15 almonds to 64 gallons of water,) which is stirred up with the water; and after 24 hours the clear liquid is decanted.

*On the action of diastase on starch.*—M. Payen, in reference to this subject, gives the following conclusions:

- 1st. That diastase exercises a saccharifying action on dextrine;
- 2d. That this action is impeded by the presence of the glucose formed, but is renewed when the glucose is eliminated;
- 3d. That the transformation of glucose into alcohol during the alcoholic fermentation presents no obstacle to the saccharization of the dextrine by diastase;

4th. That in favorable conditions of the action of diastase on starch, as much as 50 per cent. of glucose may be obtained ;

5th, and lastly. That it has not been possible to obtain 0.8791 of the starch used ; but the maximum product has not exceeded 0.5271.

*Acclimatation of the gum tree.*—M. Béchu, chief gardener of the nursery at Biskra, (Algeria,) announces that he has succeeded in completely acclimating in that establishment the *Carica papaya* of China, and the *Acacia vereck*, *Arabica* and *nilotica*, producing gum arabic, which was sold for the benefit of the establishment.

*Tannate of manganese.*—M. V. F. Marletta (*Jour. de Chim. Med.*), considers tannate of manganese as the best of the tonic, astringent, and antiseptic salts, which he finds is soluble, contrary to the usual character of the metallic tannates. The author does not give a process for obtaining this tannate ; nor do we find it noted among the numerous salts of tannic acid in Gmelin's Chemistry. We presume it may be obtained by saturating a solution of tannic acid with hydrated carbonate of manganese, (obtained by precipitating the sulphate with carbonate of soda,) and evaporating to dryness. M. Marletta recommends a series of formulas for its administration and application : a syrup 1 part to 500 ; ointment 1 part to 160 ; colyrium 1 grain to  $2\frac{1}{2}$  ounces of rose water and half an ounce of glycerin, and pills one-seventh of a grain in each. These preparations seem very weak compared with corresponding preparations of iron.

#### DETECTION OF THE ADULTERATION OF ESSENTIAL OILS WITH OIL OF TURPENTINE BY THE SACCHARIMETER.

By DR. JULIUS MAIER, Assistant in the School of Mines, Columbia College, New York.

The essential oils, especially the expensive ones, are mostly adulterated with oil of turpentine. It is often difficult to detect this adulteration, especially when the adulterated oil gives similar reactions with oil of turpentine.

With the saccharimeter it is possible not only to detect the adulteration but even to find out the quantity of oil of turpentine mixed with the other essential oils. A large number of oils,

particularly those belonging to the camphenes, the carbon of which is in the proportion of 5 to 8 to their hydrogen, have an action on the polarized light, deviating the light either to the right or the left hand side. These optical researches have been made by Biot, Soubeiran, Capitaine, Gladstone and Berthelot, in order to establish the constitution of the camphenes. I made some researches to detect the adulteration of the essential oil with the oil of turpentine.

For that purpose, a chemically pure oil of lemon which I had prepared myself, was tested in a saccharimeter, the tube of which was 200<sup>mm</sup> long.

The deviation was  $+137^{\circ} \cdot 296$  for the middle yellow ray. The oil of turpentine used for the research, prepared by myself, had a specific gravity of 0.865 and gave a deviation of  $-73^{\circ} \cdot 135$ . A mixture of equal volumes of both these oils showed a deviation of  $+30^{\circ} \cdot 65$ . The calculation gives a deviation of  $+32^{\circ} \cdot 081$  in the following manner :

$$\begin{array}{rcl} \frac{1}{2} \text{ vol. oil of lemon,} & - & = +68 \cdot 648 \\ \frac{1}{2} \text{ vol. oil of turpentine,} & & = -36 \cdot 567 \\ \hline 1 \text{ vol. mixture,} & - & = +32^{\circ} \cdot 081 \end{array}$$

A mixture of 2 vol. oil of lemon with one vol. oil of turpentine gave a deviation of  $+65^{\circ} \cdot 34$ ; from the calculation results a deviation of  $+67^{\circ} \cdot 152$ , as follows :

$$\begin{array}{rcl} \frac{2}{3} \text{ vol. oil of lemon,} & - & = +91^{\circ} \cdot 531 \\ \frac{1}{3} \text{ vol. oil of turpentine,} & & = -24^{\circ} \cdot 379 \\ \hline 1 \text{ vol. mixture} & - & = +67^{\circ} \cdot 152 \end{array}$$

I made the same researches with pure oil of juniper, which I had prepared myself, and arrived at the following results :

The oil used for the experiment had a specific gravity of 0.858 and showed a deviation of  $-5^{\circ} \cdot 970$ . The oil of turpentine employed was the same as in the above mentioned experiment. A mixture of equal volumes of oil of juniper and oil of turpentine showed a deviation of  $-40^{\circ} \cdot 84$ ; the calculation gives a deviation of  $-39^{\circ} \cdot 553$  as follows :



$\frac{1}{2}$ vol. oil of juniper, -	$= - 2^{\circ} \cdot 985$
$\frac{1}{2}$ vol. oil of turpentine, -	$= - 36^{\circ} \cdot 568$
1 vol. mixture, -	$= - 39^{\circ} \cdot 553$

From this it is proved that the quantity of the adulterating oil of turpentine can be detected through the medium of the saccharimeter. But if the essential oil is adulterated not only with oil of turpentine but also with another optically active oil, the saccharimeter test is of no value. In order to find out the quantity of the adulterating oil of turpentine from the deviation showed by the oil of turpentine, by the adulterated oil, and by the mixture, the numbers of deviation have to be brought in reference to a common distinct starting point. This starting point generally is the power of rotation, that is the deviation of the respective oil as calculated for a tube of 100<sup>mm</sup> length, and a specific gravity of 1. This power of rotation, the worth of which is generally expressed by  $[\alpha]$ , is the following for :

Oil of turpentine,	$[\alpha] = - 42^{\circ} \cdot 275$
Oil of lemon, -	$[\alpha] = + 80^{\circ} \cdot 573$
Oil of juniper, -	$[\alpha] = - 3^{\circ} \cdot 479$

The quantity of oil of turpentine employed for the adulteration is calculated as follows :

$a$	the power of rotation of the pure oil.
$b$	“ “ “ “ “ oil of turpentine.
$c$	“ “ “ “ “ mixture.
$m$	“ quantity “ “ “
$x$	“ “ “ “ adulterating oil of turpentine.

The quantity of the pure oil as contained in the mixture is  $= m - a$ , and the power of rotation of this quantity is  $= (m - x)a$ ; the power of rotation of the oil of turpentine  $= -bx$ , and the power of rotation of the whole quantity of mixture  $= mc$ ; hence results the following equation :

$$\begin{aligned}
 (m-x)a - bx &= mc \\
 ma - ax - bx &= mc \\
 ma - mc &= ax + bx \\
 \frac{m(a-c)}{a+b} &= x
 \end{aligned}$$



To show this calculation by an example, the power of rotation is supposed to be—

$$\begin{aligned}
 &\text{of the pure oil of lemon,} && = +80^{\circ} \cdot 573 \\
 &\text{" " " turpentine,} && = -40^{\circ} \cdot 275 \\
 &\text{" mixture,} && = +18^{\circ} \cdot 70 \\
 &\text{the quantity of the mixture,} && = 20 \text{ c. cm.} \\
 &(20-x) 80 \cdot 573 - 40 \cdot 275x && = 20 \times 18 \cdot 70 \\
 &7611 \cdot 46 - 80 \cdot 573x - 70 \cdot 275x && = 374 \\
 &1237 \cdot 46 && = 122 \cdot 848x \\
 &10 \cdot 0 && = x.
 \end{aligned}$$

The mixture contains equal parts of the pure oil and the adulterating oil of turpentine.

*Optical behaviour of several essential oils.*

Tested Oils.	Specific gravity.	Power of rotation.	Observer.
Oil of absinth .....	0.973	+ 20°·67	Soubeiran and Capitaine.
Oil of orange blossoms, first product.....	0.835	+ 127°·43	
Oil of orange blossoms, second product.....	0.837	+ 125°·59	
Oil of bergamot.....	0.850(?)	+ 29°·28	Biot.
Oil of bergamot, first pro- duct.....	0.850	+ 49°·396	Soubeiran and Capitaine.
Oil of bergamot, last pro- duct.....	0.877	— 6°·573	
Oil of caraway seed.....	0.897	— 11°·7	
Oil of lemon.....	0.848	+ 80°·484	Biot.
Oil of lemon.....	0.852	+ 80°·573	Maier.
Oil of lemon, (Grasse), first product.....	0.844	+ 79°·749	Soubeiran and Capitaine.
Oil of lemon, (Grasse), last product.....	0.853	+ 78°·156	
Oil of lemon, rectified.....	0.854	+ 80°·916	
Oil of copaiva balsam.....	0.881	— 34°·18	
Oil of copaiva basam, (Para,).....	0.898	— 28°·553	
Oil of cubebs.....	0.929	— 40°·159	Soubeiran and Capitaine.
Oil of cubebs, free from water.....	0.914	— 39°·40	
Oil of elemi.....	0.852	— 90°·30	
Oil of juniper.....	0.855	— 3°·521	Soubeiran and Capitaine.
Oil of juniper.....	0.858	— 3°·479	Maier.
Oil of turpentine.....	0.8722(?)	— 39°·950	Biot.
Oil of turpentine.....	0.860	— 43°·38	Soubeiran and Capitaine.
Oil of turpentine.....	0.865	— 42°·25	Maier.

Gladstone (Chem. Soc. Jour., [2], ii, 1,) has given a more complete table on the power of rotation of most of the essential oils. My researches were restricted to the few above mentioned.  
—*Amer. Jour. Science and Arts*, May, 1863.

## DATURA STRAMONIUM AND D. TATULA.

The following is given in connection with the spontaneous return of hybrid plants to their parental forms, and is also interesting from the fact that both are now in use for medicinal purposes.

Naudin maintains that hybrid plants, however constant at first, tend in subsequent generations to a separation of the two specific elements, which are, as he expresses it, rather intermixed than truly combined, so that they would at length resolve themselves into the two parental types, or by failure on one side return to the one or the other. In the "Flore des Serres" for July, 1864, he gives the results of his experiments upon our common sorts of thorn-apple, *Datura Stramonium* and *D. Tatula*. These have more commonly been taken for varieties of one species; but their specific distinction has been maintained, especially of late, by various arguments. According to Naudin, they are truly distinct species which do not sensibly vary. One always exhibits green stems and pure white flowers; the other dark purple stems and violet-tinged flowers. These two thorn-apples M. Naudin crossed in 1855, and obtained one hundred or more hybrids, both *Tatula stramonium* and *Stramonio tatula*, both just alike, and exactly intermediate between the two species in the coloration of the stem and flowers. They had, however, the peculiarity of a gigantic size, attaining at least twice the size of their parents, and a tendency to sterility, which was manifested in the failure of all the flower-buds which were produced at the first forking of the stems. The later flower-buds opened, however, and were perfectly fertile, the pods being as large and as full of good seeds as those of either parent. In 1861 the seeds of *Stramonio tatula* were sown, and produced a second generation like the first. Seeds of this crop were sown in 1862, and twenty-two seedlings were preserved for experiment. Nine individuals returned as completely to *D. Tatula*, and five did to *D. stramonium*. Two others seemed to be *D. Tatula*, and were equally reduced in, and fertile from the first forks, but they still showed in their paler coloring a trace of the other ancestor. The remaining six of the twenty-two showed somewhat more of it, both in color and in the tallness and lateness of fructification. "Here, then," says Naudin, "is a hybrid

completely intermediate between the two parent species when left to itself, fecundated by its own proper pollen, is spontaneously dissevered at the second generation, dividing its offspring between the two species.—*London Pharm. Journal*, July, 1865, from *Med. Press*.

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#### PREPARATION OF ANILINE GREEN.

One part of fuchsine is treated with a mixture of one and a half parts of sulphuric acid and half a part water, and the whole is gradually heated to dissolve the fuchsine; after the solution has cooled, four parts of aldehyde (prepared as below) are added. Heat is then carefully applied to the mixture, and as soon as it becomes of a bright blue color the heat is withdrawn. The color is best observed by letting a drop or two fall into water acidulated with sulphuric acid. The heat must be continued until no violet shade is seen. When the change to blue is perfect, boiling water and hyposulphite of soda are added simultaneously, the mixture is stirred and thrown on a cloth filter. The residue is washed with quite boiling water until it is all dissolved. The filtrate is then allowed to stand for twenty-four hours, and is then again filtered. The mass now remaining on the filter is the green color, which is dried at 30° to 38°, and then powdered.

#### *Manufacture of Aldehyde for the preparation of Aniline Green.*

—350 parts of sulphuric acid are first diluted with 150 parts of water, and when the mixture has cooled 820 parts of alcohol are gradually added. The mixture is placed in a vessel of glass or earthenware fitted with a tube and stopcock. In a tubulated retort 300 parts of bichromate of potash in small pieces and 150 parts of water, are placed. The tubulus of the retort is fitted with a funnel, and heat being applied, the mixture of sulphuric acid and alcohol is allowed to run gradually into the retort. The aldehyde distils over, and may be collected by the ordinary appliances. It requires one or two rectifications.—*London Chem. News*, June 23, 1865, from *Chem. Central Blatt*, 1865, p. 368.



## RESEARCHES ON ACETIC FERMENTATION.

BY M. PASTEUR.

It is a well known fact that wine, beer, and cider exposed to the air turn sour, and it was long since proved that this phenomenon was due to the alcohol of these liquids being transformed into acetic acid; but what part does the air play in this combustion, through what intermediary state of transformation does the alcohol pass?

Acetic fermentation is always produced by the exclusive influence of an organism—the *mycoderma aceti*—one of the most simple vegetables, consisting essentially of frames of articulations slightly compressed towards the middle, measuring about  $\frac{1}{5000}$ th of a millimetre in diameter, and double that in length. However much charged with albuminoid matter, no alcoholic liquid has ever been known to give the appearance of acetification without the presence of this mycoderm. On the contrary, if a trace of the mycoderm is spread on the surface of an albuminoid liquid, alcoholic or slightly acid, it is immediately seen to develope, extend like a veil over the surface, and by a correlative action the atmospheric oxygen in contact with the liquid disappears and the alcohol acetifies. It is not essential for the liquid to contain albuminoid matters; provided the mycoderm finds there besides the alcohol a small quantity of alkaline and earthy phosphates, it will live and its action be the same as before; and this identity proves that the albuminoids which have been employed were merely nourishment for the ferment, and not the ferment itself.

If in the actual process of vinegar making, acetification takes place without the previous spreading of the mycoderm, it must have been without the knowledge of the experimenter; it is this organism which forms the gelatinous mass which was formerly, with a vague idea of the truth, called mother of vinegar; it is this which by spreading over large surfaces of the beechwood chips used in the German process produces acetification. By pouring an alcoholic liquid on these chips, well washed and scoured, and thus deprived of the ferment, no trace of vinegar is obtained; but, the circumstances being favorable, acetification is produced by depositing a little of the mycoderm on the surface of the chips, where it rapidly develope.



While alcohol is present the small vegetable produces acetic acid ; but what happens if the alcohol is wanting ? M. Pasteur shows that the vegetable can in this case bring its burning action to bear on the acetic acid itself, and reduce it to the state of water and carbonic acid. This effect seems to be produced only when no alcohol is present, when there is alcohol the combustion is effected by preference on it.

Such is the action of the mycoderm under the ordinary conditions ; but it sometimes alters, and having no longer the same appearance or the same consistence, its action is different. It is then incapable of effecting the combustion of the alcohol to the acetic stage, and gives intermediary products with a suffocating odor, and causing the eyes to water, and which have already been obtained in the oxidation of alcohol and ether by platinum black. This black, under other conditions, will give acetic acid, and here between platinum black and *mycoderma vini* there is a resemblance of effects from which it would be unsafe to infer a resemblance of causes. The only inference to be drawn is that both are means of transporting the oxygen of the air on to certain combustible matters.

For the production of acetification it is necessary that the mycoderm should be at the surface of the liquid : the process is arrested by submersion, and only recommences on the formation of a fresh film on the surface.

The absorption of oxygen by this film is complete, and not a trace of this gas enters the liquid through it. When there is, as in Orleans' vinegar, a large quantity of small eels—animalculi needing air to support life—a curious contest takes place between them and the mycoderm, the latter tending to engross the whole of the surface, while the former combine all their efforts to submerge it and expose the liquid in which they live to free contact with the air.

The complete study of the manner in which this ferment acts and of the last interesting particulars will, perhaps, cause some progress to be made in the industrial preparation of vinegar ; but the study of possible improvements must be left to the manufacturers.—*Annales de l'Ecole Normale*, i., from *Lond. Chem. News*, July 14, 1865.

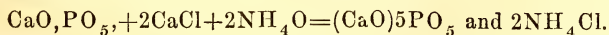
## ON A VOLUMETRIC ANALYSIS OF SUPERPHOSPHATE OF LIME.

BY GEORGE JONES, F.C.S.

It has for some time been a desideratum of analytical agricultural chemists, and especially of those connected with the manufacture of artificial manures, to be enabled by a more speedy method than the one generally pursued to arrive at a correct estimation of the amount of phosphate of lime existing in a soluble state in the so-called "superphosphate." I have therefore been led to attempt a series of experiments upon a process of volumetric estimation, by the use of a standard solution of ammonia; but at the onset I experienced some difficulty in arriving at any satisfactory result in consequence of the existence of the free or uncombined sulphuric acid, which is invariably present in ordinary commercial superphosphate, it being impossible to present an alkali without precipitating the phosphate of lime.

The process I therefore adopt is the following: Having taken 100 grains of the sample for analysis, it is first of all well mixed with about 50 grains of finely powdered litharge, and introduced along with a small quantity of distilled water into a flask, and boiled for about fifteen minutes. The whole is then made up with distilled water to 7000 grains (one deci-gallon), agitated well, and thrown upon a filter. I then take of the filtrate, by the use of a pipette, 1400 grains (200 septems), equal to 20 grains of the sample, and add thereto a little chloride of calcium solution, and 200 septems of the standard solution of ammonia; it is then made up with distilled water to a known bulk—say 2000 grains, agitated well, and filtered.

A 1000 grains pipette of the filtrate will therefore represent exactly 10 grains of the sample, and in this I now proceed to test for ammonia, added over and above that required to separate the phosphate of lime in the sample. Two equivalents of ammonia—being required for every equivalent of the tribasic phosphate of lime precipitated. Thus—



The standard solution of ammonia I am in the habit of using contains in every septum .01 of real ammonia, and I employ also

a standard solution of hydrochloric acid, 50 septems of which require 292 of the standard ammonia for neutralization.

In order, therefore, to estimate the excess of ammonia added to the liquid, I first add 50 septems of the standard acid, and then test with the standard ammonia, using, of course, a solution of litmus. Supposing, therefore, that 255 measures or septems of the standard ammonia are required to effect a complete neutralization of the liquid, then say  $292 - 255 = 37$ , and 100 (the number of measures previously added)  $37 = 63$  measures of standard ammonia required to precipitate the phosphate of lime, and equal to 6.3 per cent. of real ammonia.

Therefore as—

$2(\text{NH}_3)(\text{CaO})3\text{PO}_5$  per cent.

34 : 155 : : 6.3 : to  $x = 28.72$  p. c. of phosphate of lime.

By the use of the oxide of lead, the free sulphuric acid of the sample is not only neutralized but separated as insoluble sulphate, leaving the solution but slightly acid, and only from the acid phosphate. By repeated trials upon samples of known composition, I have never found this process to fail. It is both simple and accurate, and the time occupied from first to last is barely one-fourth of that required by the ordinary gravimetical method.

—*Lond. Chemical News*, July 14, 1865.

June 27.

## MICROSCOPICAL RESEARCHES ON THE ALKALOIDS, AS EXISTING IN CINCHONA BARK.

By J. E. HOWARD, F. L. S., ETC.

[We regret the necessity of reprinting this paper of Mr. Howard's without the beautiful illustrations of the original text; we have therefore omitted the interesting descriptions, which occupy two pages, and must refer our readers to the May number of the *Pharmaceutical Journal*.—ED. AM. JOURN. PHARM.]

In the valuable and very interesting paper "On microscopical research in relation to Pharmacy," by Messrs. Deane and Brady read at the last Pharmaceutical Conference, your readers will have been enabled to see how much assistance may be thus rendered in the discrimination of vegetable products, especially of the varieties of opium. Reference is made in the same paper to



the existence, as visible under the microscope, of the Cinchona alkaloids, *in situ*, in the bark. I am far from supposing that any such practical application can be made of this discovery, which I announced in my "Nueva Quinologia" in the year 1861, for the following reason:—the combinations of the alkaloids with kinic acid are extremely soluble, so that in any bark in which these are the prevalent constituents, it is very difficult to ascertain any crystalline appearance. But this is not the case in all cinchona barks, as for instance in the commercial red bark, the *C. succirubra*, in which the prevalent combination appears to be of a different kind. It is in reference to a very fine specimen of this red bark that I published the following observations:

"In order to gain as much information as possible from the rich bark under consideration, I made sections of a portion for microscopic investigation, and was rewarded by some appearances which I had not before seen. The eye was at once arrested by very numerous stellate groups of crystals, diffused irregularly throughout the substance of the bark. I thought at first that they must be *raphides*; but further investigation led me to see that they are entirely soluble in spirit of wine, and even in ether, that they polarize the ray of light, and thus much more resemble combinations of the alkaloids than those bodies which are called raphides, and which are understood to be composed of salts of lime and magnesia, insoluble in the media above named.

"The crystals are arranged in the substance of the bark indeterminately, and without any reference to the organic structure of the bark. They are not formed in the cells, but cross these in every direction,—radiating generally from some small nucleus, and presenting very much the appearance of some compounds of the alkaloids in their crystalline form. They evidently are not the product of vital processes taking place in the plant in its living state, but must result from changes in the juices of the bark after its removal from the tree;\* indeed, it can be no

\* "Seven pounds of green give four pounds of dry bark in this species; (*C. succirubra*), (Spruce, Report, etc., p. 28,) while the freshly-peeled bark of the *C. lancifolia* dries to one-third of its weight (Karsten, Medicinische Chinارينden, etc., p. 17), so much greater, in its growing state, is the density of the fluid constituents in the former kind of bark than in the latter."



surprise if a sap-fluid containing eleven or twelve parts of salts of the alkaloids in a hundred should then at least (if not even whilst maturing on the tree,) betake itself to crystallization.

"In order to observe these perfectly, I found it necessary that the section of bark should not be too thin, as otherwise the action of the caustic would be too powerful, leaving only the ultimate structure of the cellular tissue. I compared the crystals with those of Cinchonine, Quinidine, and Cinchonidine; but the character of the decoction of the bark being always acid, seemed to forbid the expectation, which indeed was not realized, of finding the crystals coincide with these. At length it occurred to me to compare the crystallized compound of quinine, formed, as I have mentioned, under the head *C. succirubra*, by adding quinine to the ethereal solution of the mother-substance from the heartwood of the tree. I found the crystals, which under some circumstances this compound forms, to agree exceedingly well with those seen in the bark. The feeble amount of polarization in the two was a point of coincidence that could not be passed over; and on the whole, it is almost certain that the quinine is in this state of combination in Red Bark, since the decoction abandons, by cooling, a deposit in which I have ascertained the presence of quinine, cinchona-red, and kinovic acid, and after this has been deposited, no trace appears to exist of kinate of quinine, the only other probable form.

"I therefore conclude that the crystals seen in the bark-section are *Kinovate of Quinine*, rather than kinova-tannate or cincho-tannate, since the cincho-tannic acid oxidises off into cinchona-red, and leaves the quinine in combination with kinovic acid, as an almost colorless salt, such as is seen in the section" (as published in the "*Quinologia*"). It is, however, not improbable that the cincho-tannic acid, during its oxidation, facilitates the combination; and as the kinovic acid in the different parts of the plant holds the exactly inverse proportion to the amount of alkaloid obtained, it is difficult to avoid the presumption that the elements of kinovic or kinova-tannic acid in conjunction with ammonia, which is always present, may give rise to the alkaloids in the bark.\*

\* See, as above, under head *C. magnifolia*.

The mother-substance I have referred to is described in the above work, under the head *C. succirubra*. It is extracted unchanged from the heartwood of the tree, by the simple action of ether, and appears like a resin when dried, having the composition  $C_{46}H_{36}O_{10}$ .\* In this state it is not deliquescent, differing in this from cincho-tannic acid, and it is permanent. It may be heated in a sealed tube for twenty-four hours with chloride of ammonium without being decomposed; but, by the addition of a few drops of liquid ammonia, the bright yellow ethereal solution changes to a beautiful pink color. By boiling with lime and water, it is broken up into kinovic acid (which passes through the filter in combination, separating with acids,) and into very pure cinchona-red, which remains behind with the rest of the lime on the filter. This last is evidently the product of the oxidation of the cincho-tannic acid. The mother-substance appears to undergo some change in the roots. It becomes less soluble in ether, contains less kinovic acid, and the substance, separating with lime, is no longer pure cinchona-red.

Now it is possible, both by *synthesis* and *analysis*, to obtain presumptive evidence that the crystals seen in Red Bark are in the above state of composition. By *synthesis*, because by the addition of an ethereal solution of quinine to that of the mother-substance, a red-colored compound ensues, which is capable, though with difficulty, of being crystallized from water, with separation of the cinchona-red, and also from spirituous media. By *analysis*, since the same bark, treated in exactly the same manner with Liq. Potass. and then boiled with spirit of wine, yields Quinine, Cinchonidine, and Cinchonine.

We have next to consider whether one, or more than one, of the alkaloids are perceptible; and to assist in answering this question, I must beg your readers to compare my plates with those in Mr. Stoddart's paper "On the Purity of Sulphate of Quinine of Commerce."† I think that the correspondent forms will at once suggest the analogy which is probably the true one. The small tufted groups of crystals are quinine, (quinidine, when

\* See my "Quinologia," under head *C. succirubra*.

† See January number of this volume.

combined as above, has much the same appearance, but was not present,) and the larger and coarser crystals are in all probability cinchonine. It is not at all unlikely that cinchonidine may be indicated in some of the small aggregations of crystals. These crystals present a pleasing and varied appearance under the microscope, but I have not yet succeeded in making permanent preparations, since the glycerine which I generally employ gradually dissolves most of them, and I have not yet found any medium free from this objection. I had some specimens mounted in cells in pure water, intended for the museum of the Pharmaceutical Society, but found that the crystals slowly dissolved even in water.

Dr. Berg, of Berlin, in a recent publication, remarks, "The crystals which Howard figures are not found in that manner in the bark, but are first formed through chemical treatment of the preparation." In this, as in most of his observations on barks, the Professor seems to have drawn rather largely on the stores of his own insight. I am unable to conceive how it is possible that boiling a section of bark for two or three minutes in an exceeding weak caustic solution, washing with abundance of distilled water, and placing the slice immediately under the microscope, could by any possibility produce crystals intersecting the cells in all directions,\* neither can I understand why it should invariably do this in one species of bark and in many others not at all.

The fact is that Dr. Berg's mode of preparation empties the cells of *all their contents*, and he cannot believe that any one has seen what he has not himself observed.—*London Pharm. Jour.*, May, 1865.

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#### ARSENIC EATING.

Dr. Maclagan, of Edinburgh, on a visit to Styria in the spring of this year, obtained conclusive evidence of the existence of this

\* The bark must previously be macerated in water for twenty-four hours. From the time the slice is cut to its being placed under the microscope, less than five minutes should elapse, of which two minutes are passed in the boiling solution.



practice, and has published in the *Edinburgh Medical Journal* a circumstantial account of what he saw. We quote one case, in which it will be seen no jugglery could have been practised:—“Mathias Schober, a healthy-looking, fresh-complexioned, fairly muscular young man, of the age of 26 years, and about five feet nine inches in height, a native of Liegest, and employed as a house servant there, said he had taken Huttereich for about a year and a half—not, however, white arsenic, but the yellow arsenic, or orpiment, of which he took a specimen from his pocket and showed it to me. Of this I retained a piece for chemical investigation. He informed me that he took the arsenic in order to keep strong, though he had never suffered from ill health. He said he had never experienced any bad effects, even when he first began using it; that he had at first taken rather less than a grain every fortnight; that he now took it twice a week; and that on omitting to take it for any longer period he experienced a longing for it, which was relieved by a repetition of the usual dose. His reason for taken the orpiment instead of the white arsenic was, that it was more easily procured; but having professed himself quite indifferent whether it were arsenious acid or the sulphuret, Dr. Knappe produced a paper containing the former (of which I also kept a sample), and having asked him to choose out a piece such as he was in the habit of taking, it was weighed, and found to be nearly five grains. We had no finer weight than one grain; but the piece of arsenic was much over four, though less than five. Dr. Knappe, having carefully ground this to powder on a clean piece of paper, it was transferred to a small piece of plain white bread, about as large as a man’s thumb-nail, and this the doctor put into his mouth. Schober chewed it and swallowed it, and then swallowed another portion of bread the same size immediately after. This was at 9.30 A.M. He stayed with us a few minutes, but he had to return to his work, promising, however, to come back in a short while. This he did at 11.30, two hours after, and made water in my presence to the amount of what I estimated at twenty-eight ounces, into a vessel previously carefully cleaned, and the urine was put into bottles thoroughly washed by myself. Unfortunately, in the hurry of my departure, in trying to pack these bottles into my hat-box, I



broke one, and thus lost part of the urine. Since my arrival in this country I subjected the contents of the two remaining bottles to chemical analysis, adopting the distillation process of Dr. Taylor as the most convenient way of separating arsenic from the organic matters of the urine. For this purpose the urine was carefully evaporated to dryness in a clean retort. The nearly dry residue was covered with strong hydrochloric acid, and distilled into a well-cooled receiver. The product, amounting to about half an ounce, was a clear, feebly pinkish fluid, thirty minims of which, when treated both by Reinsch's and Marsh's process, gave very characteristic arsenical deposits. Schober also came the following day to see me, having taken no more arsenic since the dose which he had swallowed before me twenty-six hours previously. I again secured some urine which he passed in my presence, and this, when chemically examined as above, also yielded arsenic freely." Dr. Maclagan adds—"It is evident that the confirmation of the existence of the practice of arsenic-eating must lead us to modify some of the opinions that are entertained with regard to the influence of habit on the action of poisons. It has long been notorious that, by habit, the human body may be brought to bear with impunity doses of organic poisons, such as opium, which, to those unaccustomed to them, would certainly prove fatal; but 'it has hitherto been considered by toxicologists that, except within very narrow limits, habit appears to exercise no influence on the action of mineral poisons.' (Taylor 'On Poisons,' p. 89.) Though the experiment of M. Flandin, by which he proved that he could bring dogs to bear fifteen grains of arsenious acid in powder in twenty-four hours without injury to their appetite or health, and the practice of administering arsenic to horses, have long been known as pointing rather in the contrary direction, this has been supposed to be due to some peculiarity in the constitution of the lower animals. The facts which have been ascertained with regard to the Styrian arsenic-eaters, and which the above observations confirm, entitle us to maintain that the modifying effect of habit is not confined to organic poisons, but extends to those of mineral nature—at all events, to arsenic."—*Chem. News*, July 21, 1865.

## ARSENITE OF STRYCHNIA.

By M. F. CERESOLI, of Paris.

This salt appears to have been first examined therapeutically by Prof. Grimelli, for whom it was prepared by M. Chiappero, of Turin, who made it by neutrallizing a solution of arsenious acid in diluted muriatic acid with strychnia. In this way the salt contained muriate of strychnia. To avoid this result the author sought a process by double decomposition, based on the fact that sulphate of potassa is insoluble in alcohol whilst arsenite of strychnia is readily dissolved by this liquid of 86 per cent. The following is the process :

Take of Caustic potassa,	. .	3.12 grammes.
Arsenious acid,	. .	3.30    “
Distilled water,	. .	60.00   “
Sulphuric acid,	. .	2.65    “
Crystallized strychnia,	. .	12.00   “

Dissolve the caustic potassa in 40 grammes of the water heated to ebullition, add the arsenious acid and form a solution. Then dilute the sulphuric acid with 20 grammes of distilled water, heat to ebullition and add the strychnia, so as to form a complete solution. The two solutions are then mixed at the temperature of 204° F., adding the arsenite of potassa to the sulphate of strychnia. A magma of crystals of sulphate of potassa and arsenite of strychnia is thus produced. Heat causes the latter salt to dissolve when the solution is filtered from the undissolved portion of sulphate of potassa, and is then evaporated nearly to dryness. The saline mass thus obtained is treated with alcohol, which separates the remainder of the sulphate of potassa. The alcoholic solution is then allowed to evaporate till crystallization occurs, which is in about two days.

Arsenite of strychnia crystallizes in cubes of a dead white ; it contains water which is lost by exposure to the air. Heat decomposes it completely, and leaves for a residue a black and porous charcoal. The odor by the action of heat is at first empyreumatic, followed by dense white vapors and the odor of garlic. Its taste is bitter and metallic. It is without action on polarized light, soluble in alcohol, less soluble in ether, and solu-

ble in 10 parts of boiling and 35 parts of cold water. On analysis this salt gave the following formula:  $C_{42}H_{22}N_2O_4, AsO_3$ .

The author believes this salt deserves a place among well defined salts, and therapeutically it must be uniform in its action, owing to its regular composition.—*Jour. de Pharmacie*, Mai, 1865.

## ON SPIRIT OF NITROUS ETHER AND NITRITE OF SODA.

BY ROBERT WARRINGTON, F.R.S., F.C.S.

The spirit of nitrous ether, as a pharmaceutic compound, dates back to a very early period. In the thirteenth century, in the writings of Raymond Lully, its preparation is mentioned, and two hundred years afterwards an improved process for making it is given by Basil Valentine. A very good idea of the nature of these old processes, and of the curious state of chemistry a century and a half since, may be obtained by perusing the "Dispensatory" of Dr. Bates on this subject; the second edition of which work, published in the year 1700, by Dr. Salmon, imparts such a graphic idea of the state of the manufacturing processes of pharmaceutic chemistry at that period, and the curious theories and quaint explanations of chemical action then current, that I feel I need hardly apologize for giving the account in detail. Dr. Bates, it appears from the preface, "was Physician to two Kings and a Protector," (Cromwell, Charles II., and James II.) In order to clearly understand the operation of making the sweet or dulcified spirit of nitre, it will be better that we should commence with the process for the spirit of nitre (nitric acid) employed. Some of the clauses which do not refer to the chemical part of the subject have been omitted. At p. 53, we have "Spiritus nitri, spirit of nitre. Bates). R Sand p. ij. nitre p. j. Mix and distil by a retort till the fumes cease to appear. Salmon). § 1. Here is but p. ij of sand to p. j of nitre, which I judge too little; the *Colledge* in their Dispensatory allow 5 to 1, as you may see in our Pharm. Lond. lib. 3, cap. 10, sec. 47. But three to one is by experience found to be the best proportion. § 2. R Pure nitre lb. ij: common bole, or potter's earth, lb. vj. Mix, and put them into a large earthen or glass retort luted, set it in a close reverberatory furnace fit-



ting to it a large receiver ; give a gentle fire for four or five hours, till all the flegm is come forth, which will be drop by drop. § 3. When it will drop no more, cast away the flegm in the receiver, and refit it, luting the juncture, increase the fire gradatim to the second degree, so will the spirit come forth, filling the receiver with white clouds, continue the fire in that equality for two hours, and then increase it to the greatest violence, and the vapors will be red, which continue till all is come over, which will be in about fourteen or fifteen hours. § 5. This spirit is the best *aqua fortis* that can be made. § 9. You must not fill the retort above two-thirds full, and the recipient must be very large, for that the spirits being strong and the vapors plentiful, and withal coming hastily forth, they would break all to pieces, if they had not room to expatiate in. § 10. This spirit, from its coming forth in red vapors, is by some authors called *the Salamander's Blood*, and being thus at first freed from its flegm, will act with so much the more force. § 11. This spirit will dissolve or rather corrode all metals, except gold, into which it cannot enter alone by reason of the smallness of the pores of that metal ; but if you add to it a fourth part of its weight of sal ammoniack, or of sea salt, or of sal gem, it will give a new form to its particles, shaping them into more subtil points capable of entering into the pores of the gold, and to penetrate and dissolve its substance."

At p. 54, we have "Spiritus nitri dulcis, dulcified spirit of nitre. (Bates). & Spirit of nitre p. j, alcohole of spirit of wine p. ij. Digest till they are joined, and distil in sand, cohobating twice, S. A. (Salmon). § 1. This proportion of 1 to 2 is that which is observed by Le Mort, Maets, and Margrave ; but Rolfincius, Chirras, and Lemery make the mixture in equal parts of each. § 2. In mixing them you must be very cautious, and do it leisurely and by degrees ; you must not put the spirit of wine to the spirit of nitre, for then you will set it all on a flame. § 3. But you must put in the spirit of nitre gradatim into the spirit of wine, so you will prevent the flaming, but the mixture will grow so hot, that you will scarcely be able to hold your hand on the outside of the vessel. § 4. Being mixed together, digest for seven days, then put the mixture into a glass retort, and distil



in sand, first with a gentle heat, and afterwards with a stronger, to driness. § 5. The receiver let be very large, and the neck of the retort fit for it, and so enter a good way in, and the juncture to be well luted, for otherwise you will lose much of your spirit. § 6. It is necessary that the spirit should be cohobated twice at least, some authors advice thrice; for the oftener it is cohobated the sweeter it is. § 12. In this mixture the spirit of nitre joyns itself to the sulphur of the wine, and both being admirably volatile, they strive to mount upwards, whereby the mixture is put into that mighty motion and effervescency; and from whence results a complicate spirit, being most fragrant, and having the greatest volatility. § 14. Rolfincius, in *Chemia*, lib. 3, sec. 1, art. 4, cap. 11, advises after four days digestion to distil it in an alembick, so, says he, will the spirits in this operation be united, and contract a violet kind of odor or smell, and a subdulce and grateful taste."

Now this process, of acting upon spirit of wine by nitric acid, has been handed down in the various editions of our *Pharmacopœias* with very little alteration, except in the employment of more definite materials, until within comparatively a few years since. The nitric acid and rectified spirit have varied in the proportions in the different *Pharmacopœias*, from one of acid and three of spirit to one of acid and seventeen and a quarter of spirit. The product has been variously designated as *spiritus nitri dulcis*, *spiritus ætheris nitrosi*, *spiritus ætheris nitrici*, *spiritus æthereus nitrosus*; the more common commercial terms, however, have been, spirit of nitre, sweet spirit of nitre, or sometimes simply nitre.

In 1826 the Dublin College introduced nitrous ether into their list of preparations. The process consisted in submitting to distillation a mixture of dry nitrate of potash 24 oz., of strong sulphuric acid 16 oz., and rectified spirit 19 fl. oz. The acid and spirit being first mixed together and allowed to cool before addition to the nitrate of potash. The distillation is ordered to be slowly and carefully conducted, and the uncondensed vapors passed into another vessel through 16 oz. of spirit kept cold. This ethereal liquid is then to be purified by agitation with dry carbonate of potash. If required very pure it is to be redistilled

by a water-bath at  $140^{\circ}$  F., until one-half has passed over. It has a specific gravity of  $\cdot 900$ . The process is stated to be that of Wolfe, and has been found by Pelletier to succeed better than any other.

In the year 1839 the Edinburgh College also gave a process for the preparation of nitrous ether, but simply as a preliminary step in the manufacture of spirit of nitrous ether. The method directed is to add by degrees, through a safety tube in a matrass, 7 fl. oz. of nitric acid, of  $1\cdot 5$  specific gravity, to 15 fl. oz. of rectified spirit, taking care that the action is not too violent, and that the receiver be kept cooled. The ether thus obtained is purified from acid by a little milk of lime, and from water and spirit by a concentrated solution of chloride of calcium (muriate of lime.) The product ("pure hyponitrous ether") thus obtained should have a density  $\cdot 899$ . This is then mixed with four times its volume of rectified spirit (so that the mixture would contain 20 per cent. of nitrous ether), and the resulting spirit of nitrous ether is stated to have the specific gravity  $\cdot 847$ . This can hardly be correct, as the density of rectified spirit is  $\cdot 838$ , and the mean of the volumes above will yield a result of  $\cdot 850$ . The gravity stated by the Edinburgh College would therefore entail an increase of volume on admixture which is not probable. The test given for the strength of spiritus ætheris nitrici is that, "when agitated with twice its volume of concentrated solution\* of muriate of lime (chloride of calcium) 12 per cent. of ether slowly separates." Now as the proportion of ether added to the spirit was 20 per cent., it is evident that 8 per cent. is held in solution by the mixture of spirit and chloride of calcium. The last Dublin Pharmacopœia contained a process of a similar kind; that is, forming a nitrous ether by the action of nitric acid on spirit, purifying the product by ammonia, and mixing it with  $10\cdot 5$  volumes of rectified spirit, or with more than  $2\cdot 5$  times the quantity used by the Edinburgh College, making the product, of course, less than half the strength as regards the ether.

\* This should be "saturated," as otherwise the test is most uncertain. This can only be ensured by always having undissolved crystals present in the solution employed, the point of saturation varying much with temperature.

The spirit of nitrous ether met with in commerce I have never found to yield any ether by the chloride of calcium test, nor have I ever heard of any which did. It could not, therefore, contain more than 8 per cent. of ether, that being the point at which the test will begin to indicate. In the last process of the London College for 1851 the gravity of the product (obtained by the distillation of nitric acid with rectified spirit) is stated as below that of the spirit used, namely  $\cdot 834$ , rectified spirit being  $\cdot 838$ , which can only be accounted for as an increase in the percentage of alcohol by the slow distillation. The amount of nitrous ether present here must have been very small. Such then was the position of this manufacture, as far as regards officinal preparation, up to the time of the issue of the British Pharmacopœia.\*

The original formula suggested by the Dublin Pharmacopœia Committee, and handed to me, as Consulting Pharmaceutic Chemist to the London and Edinburgh Committees, for trial, was as follows:—"6 oz. of nitrate of soda, 200 grs. of charcoal in very fine powder,  $3\frac{1}{2}$  oz. of sulphuric acid, 25 fl. oz. of rectified spirit. Mix the nitrate of soda with the charcoal, both in fine powder, and deflagrate the mixture in small and successive portions in a Hessian crucible raised to a low red heat. Then increase the temperature to produce perfect liquefaction, pour out the salt on a clean flag, and when cool reduce it to powder. Place it in a matrass connected with a condenser, and pour on the spirit and acid previously mixed. Distil over 20 fl. oz. Specific gravity  $\cdot 835$ ." By experiment, deflagrating at as low a heat as possible, this yielded a product having a specific gravity  $\cdot 853$ , and giving by the chloride of calcium test 8 measures of ether per cent. separated, equal, therefore, to 16 per cent. really present, or 53 per cent. of nitrite of soda in the salt employed.

This formula was then altered by the committees to that which now stands in the Pharmacopœia, namely, 5 oz. nitrite of soda, 4 fl. oz. of sulphuric acid, 40 fl. oz. of rectified spirit. Distil 35

\* [NOTE. The late Dr. Hare suggested the nitrites of soda and potassa in the residues of the oxygen process, for making spt. of nitrous ether. See vol. xii., page 115, of this Journal, July, 1840.—*Editor Am. Jour. Ph.*]



fl. oz. (seven times the quantity of the nitrite employed). Specific gravity  $\cdot 843$ . The preparation of the nitrite of soda was made a separate process, thus—16 oz. nitrate of soda,  $1\frac{1}{4}$  oz. of charcoal recently burned, and in fine powder; mix and drop the mixture in successive portions into a clay crucible heated to dull redness. Raise the heat to liquefy it, and pour on to a clean flagstone. In carrying this operation into practice, it was found that 32 fl. oz. only could be obtained by distillation, and that it required the addition of more spirit to make up the yield to 35. The specific gravity, also, was  $\cdot 850$ , and the percentage of nitrous ether below that indicated. In examining into the reason of this deficiency, it was found that on the addition of the mixed spirit and acid to the salt, a crust of sulphate of soda, in a comparatively insoluble state, was formed on the surface of the nitrite of soda, which enclosed and thus protected the remainder from the action of the acid, until a great deal of the spirit had distilled over, and that it was hence some time before much nitrous ether was produced. To prevent this the nitrite was first dissolved in 10 fl. oz. of water before the addition of the acid and spirit, and with this modification the whole quantity directed can readily be distilled off.

A great deal of difficulty, I believe, has arisen in preparing the nitrite of soda for this manufacture, and there can be no doubt that if great care is not observed in the process of deflagrating the nitrate of soda and charcoal, a considerable percentage of carbonate of soda or even caustic soda is formed, with, of course, an equivalent loss of nitrite. The proportion of charcoal ordered is indeed rather above the quantity required, 1.13 oz. being the calculated proportion instead of 1.25. One ounce, however, will be found practically sufficient. In working on the large scale, the process of deflagration is also a very tedious one, and if the workman endeavors to expedite his operations by the projection of too large a quantity of material at once into the heated vessel, the chemical action is increased to such an extent that he is sure to destroy a great deal of the nitrite he is endeavoring to prepare. As I had obtained such good results by controlling this operation within its lowest possible limits, it was attempted next to effect the partial deoxidation of the nitrate of



soda without allowing deflagration to take place at all, and this at times has been very successfully performed; but it has this great drawback, that despite all the caution employed, the mixture is always liable to burst suddenly into deflagration and even comparative explosion.

It was next tried to substitute a harder form of carbon for the purpose, and finely powdered plumbago was selected; this is somewhat more manageable and under control, and has answered the purpose better. Several hundred pounds weight of salt, containing about 75 per cent. of nitrite of soda, have been manufactured by this means; still at times we have had sudden bursts of deflagration, and this makes the men nervous, from its occurring when they were off their guard, and burning their clothes or skin.

My next experiment was to substitute for the charcoal an equivalent amount of carbon in the form of starch, and this has yielded us the most satisfactory results, and with very little trouble. Seven parts of dried nitrate of soda in fine powder is mixed with one of starch powder, and thrown by small quantities at a time into a shallow iron pan heated from below; the mixture spumes and melts as the water and carbonic acid pass off, and the salt ultimately fuses. When it has become quite white, it is laded out and cooled. We have already made between three and four hundred pounds weight by this process, and without any annoyance from deflagration, the heat of course being carefully regulated. In these operations we have always employed iron vessels, as the metal vessel relieves us from the annoyance of loss arising from leakage or fracture of the earthen crucible, and the small quantity of oxide of iron that is found mixed with the product cannot in any way interfere with the after process. The spirit of nitre that has been produced from nitrite of soda thus prepared has yielded us, by the chloride of calcium test, 5 per cent. of separated nitrous ether, or 13 per cent. as a whole; and in consequence of this steady yield, we have been obliged to reduce the proportion of nitrite used in our manufacture to meet this excess of strength; the British Pharmacopœia ruling that the spirit is to yield  $1\frac{1}{2}$  per cent. of nitrous ether when submitted to the test, or a total content of 9.5 per cent.

Assuming the specific gravity of the nitrous ether separated by the chloride of calcium to be .899, as stated by the Edinburgh College, or .900 as stated in the Dublin Pharmacopœia of 1826, the proportion of nitrite of soda directed by the British Pharmacopœia should yield, if pure, a spirit of nitrous ether containing 17.25 per cent.\* The above result, 13 per cent., would imply a percentage of nitrite of soda in the salt used equal to 75.34,† a conclusion which has been further confirmed by the amount of nitrogen gas evolved by decomposing the salt with chloride of ammonium. On the same basis of calculation it would require the nitrite of soda used to contain 55.07 per cent. of real nitrite in order to produce the strength specified by the British Pharmacopœia, and 46.32 to bring the mixture of spirit and test liquor up to the point of saturation, or 8. per cent.‡

Since the appearance of the British Pharmacopœia, I have again procured samples of spirits of nitre from several of our leading manufacturers, but in no case have I yet found sufficient nitrous ether present to yield any indication by the test. In fact, it has been admitted that a salt containing 25 per cent. of real nitrite is the best product that has been obtained by the process of deflagration.

APOTHECARIES' HALL, BLACKFRIARS, June, 1865.

—*London Pharm. Jour.*, July, 1865.

#### IMPROVEMENTS IN THE MANUFACTURE OF SUGAR.

A correspondent writes:—"I have seen some sugar from Antigua which is the result of a new mode of boiling down. This sugar is in reality only boiled down juice, and yet is so dry

\*  $\text{NaO}, \text{NO}_3 : \text{EO}, \text{NO}_3$  by Weight. By Vol.

$$\begin{array}{rcl} 69 & : & 75 :: 5 : 5.435 \\ & & \hline & & .900 \end{array} = .604 \text{ in 35 of spirit of nitrous}$$

ether = 17.25 per cent. Nitrous Ether.

† Thus:—17.25 : 100 :: 13 : 75.34; or, 100 : 13 :: 35 : 4.55 + .900 = 4.095.  
Then, 75 : 69 :: 4.095 : 3.767 + 20 = 75.34.

$$\begin{array}{l} \dagger \text{ And } \left\{ \begin{array}{l} 9.5 + 100 \\ \text{B. P. } \left\{ \begin{array}{l} 17.25 \end{array} \right. \end{array} \right. = 55.07. \end{array}$$

that after being carried in paper in the hold of a ship some weeks only a few moist spots are observable. This every one knows is possible only with very dry sugar. The color is light grey, or better than colonial sugar from which the treacle is extracted. In other words, this is sugar manufactured without molasses or treacle being formed. Now, if we take the amount of loss from crystallizable sugar being made into treacle at 20 per cent., this increase in the amount of sugar will at once be given to our colonies, if this method is practicable. It is equal to increasing them by nearly one-third without trouble or expense.

"We learn from Antigua papers that Mr. Alfred Fryer, of Manchester, has been making the first trial in that colony, where the firm, Messrs. Fryer, Benson and Forster, have bought sugar estates for the express purpose of beginning the new system.

"It is well known that when the juice of the cane is boiled down the amount of uncrystallizable matter increases. The increase may be said to be 14 or 15 per cent., but an equal amount of sugar is thereby rendered uncrystallizable, so that about 30 per cent. is actually lost to the consumer.

"Mr. Fryer found that cane-juice containing 2.6 per cent. of fructose or uncrystallizable sugar, after being heated in a closed vessel for an hour without air, at 250° Fahr., contained 55 per cent. of fructose. Juice which contained 13.1 per cent., by boiling for an hour at 225° F., was found to have 29.5 per cent. of fructose. The temperature reached in the colonies is about 242° F.

"After the juice had been boiled down into dry sugar by Mr. Fryer, and then dissolved in the same amount of water which it had lost, it actually contained as much crystallizable sugar as before. It is believed that no fructose whatever is passed, and other experiments made by Mr. Fryer seem to confirm this. He has found that the cane-juice is not entirely free from fructose, that, on the contrary, from 1.3 to 13 per cent. of the sugar exists in that state; it is impossible, therefore, to obtain boiled-down sugar entirely crystallizable.

"The name given to this apparatus for rapid evaporation is 'the concreter,' as the sugar is obtained in a solid hard form, in which condition it is sent over to this country to be refined.



“The amount of acidity is equal only to that in the cane-juice. The color of the dissolved concrete is superior to that of the juice left after the first crystallization in sugar works, and the sugar beetle, we believe, does not appear.

“No wonder that the Governor of Antigua should have said to Mr. Fryer, at a large public and enthusiastic meeting, ‘I believe firmly that you have opened a new era of prosperity to our colonies, and heartily wish you abundant success in the course on which you have entered.’

“It seems true, and it is wonderful, that whilst we have been complaining so long in our sugar colonies, we, and the rest of the world, should have been spoiling one-third of our sugar. Mr. Fryer estimates the increased value of the produce treated by his system to be equal to £4 per hogshead. We need not give a description of the evaporator, which consists of very shallow vessels connected in series and the use of heated air.”—*Chemical News*, London, June 30, 1865.

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#### ON A BETTER MODE OF PREPARING RED OXIDE OF MERCURY OINTMENT FOR APPLICATION IN CERTAIN CUTANEOUS DISEASES.

BY ALEX. BALMANNO SQUIRE, M. B., ETC.

Having had frequent occasion to make use of ointments containing the red oxide of mercury in the treatment of chronic disease of the skin, it occurred to me that the activity of that ingredient might be greatly increased by its being prepared in a different manner to that directed in the British Pharmacopœia. On making trial of my new preparation, I found it not only more pleasant to the patient, but decidedly more efficient as a remedy.

My original opinion has now been confirmed by a pretty extensive use of both preparations, and as a revised edition of the Pharmacopœia is expected shortly, and the remedy is one of extensive use, I have thought the subject worthy of the attention of the Pharmaceutical Society.

It will be well, in the first place, to review the modes in which



the binoxide has been directed to be prepared in the British and in the preceding London Pharmacopœias.

In the British Pharmacopœia, under the name of red oxide of mercury, it is directed to be prepared by the action of nitric acid on metallic mercury, and the subsequent application of heat to a mixture of the resulting nitrate with metallic mercury.

In the last London Pharmacopœia, under the name of nitric oxide of mercury, it is prepared by the application of heat to the nitrate.

In the last London Pharmacopœia but one, two different processes are given: the one is almost identical with the process last mentioned, and its product is called the nitric oxide; the other is the decomposition of a solution of corrosive sublimate by a solution of potash, and its product is termed the binoxide.

The ointment in this last-mentioned Pharmacopœia is prepared from the nitric oxide, the binoxide being used only in the preparation of the bicyanide of mercury. It is my object this evening to show that the binoxide should have been chosen for the ointment rather than the nitric oxide, and to give what I trust may be thought sufficient reasons for advocating the revival of the former in the British Pharmacopœia, not indeed for the purpose for which it was formerly introduced, but as an infinitely better substance than that now used for the preparation of the red oxide of mercury ointment.

Oxide of mercury ointment appears always to have been prepared with the nitric oxide; it is so directed not only in the British Pharmacopœia, but in the London Pharmacopœias of 1851, 1836, 1824 and 1809.

One possible reason for this preference for the nitric oxide is, that in the condition of scales, the oxide of mercury is less capable of adulteration, since its physical properties, *e. g.* the reflection of light from the glittering scales, enable it to be more readily recognized.

But one can readily understand how the so-called binoxide should be a more active remedy.

A mere comparison of the naked-eye appearance of the one with that of the other will suffice to show how much smaller the particles of the binoxide are: theirs is a paler and a duller color.

There is, in fact, just the difference that is seen between coarsely-pounded colored glass and the same glass finely pulverized.

Under the microscope this difference is yet more clearly perceptible. An examination of the precipitated oxide shows that none of its particles exceed the thirty-thousandth of an inch in diameter; while the same scrutiny applied to the best levigated nitric acid shows that although a great number of its particles scarcely exceed the size just mentioned, many of them are as large as the five-hundredth of an inch. The diameter of a large proportion of the particles of the unlevigated nitric oxide is as much as the one-hundredth of an inch.

The advantages of ointment made with the precipitated oxide of mercury over that made with the so-called nitric oxide, are, in the first place, that supposing ointments of equal therapeutical value be used, greater economy is gained by the use of the precipitated oxide, since a less proportion of it will suffice in the same quantity of ointment.

But there is a more serious objection to be urged against the use of the nitric oxide, and that is, that the presence of a quantity of gritty particles in an ointment which is to be rubbed in over a raw and irritable portion of skin, produces a totally different action in it to what is sought for when an ointment of the red oxide of mercury is employed.

One of the uses of the ointment of the flowers of sulphur in the treatment of scabies is, that the gritty particles of sulphur do, as it is rubbed in over the skin, actually rupture the tunnels in the epidermis in which the *acarus scabiei* resides, and so lay bare the itch-mite to the poisonous influence of the sulphur; and although the particles of well-levigated oxide are much less coarse than those of the sulphur, still it must be remembered that they are applied usually to much more delicate surfaces.

This disadvantage in the use of nitric oxide I have more especially noticed in hospital and dispensary practice, where the oxide employed, except for ophthalmic use, is often by no means carefully levigated, and where the introduction of ointment made with the precipitated oxide would ensure, irrespective of quality, a fine division of the particles.

But I have also often had occasion to observe on the skins of

persons for whom I had prescribed ointment containing the levigated nitric oxide, and whose prescriptions had been made up by the first chemists, very obvious glittering red scales.

Here is some of the red oxide of mercury ointment of the British Pharmacopœia, and here again is the same preparation, except that precipitated has been substituted for nitric oxide; you may observe how much "smoother" an ointment the precipitated oxide makes.

However, although the fine state of division of the particles of the binoxide and the consequent "smoothness" of the ointment made from it are strong presumptive proofs in its favor, the absolute proof of its superiority over the nitric oxide is to be found in the fact, that patients who have first made use of the latter and then of the former, always declare, and that without any prompting, in favor of the binoxide.

A lady lately under my care accidentally underwent a *three-fold* change, from nitric oxide to binoxide, and then back to nitric oxide again. She had suffered for the last sixteen years from a chronic cutaneous disease, which, notwithstanding that she had been under treatment the greater part of that time, had slowly but steadily got worse. The irritation occasioned by it was so intense and so unrelenting, that it was a constant source of torment. In conjunction with other remedies, I directed the use of an ointment containing the nitric oxide. Although considerable improvement took place, it did not progress so rapidly as I desired; finding this, I wrote for precipitated oxide in place of nitric oxide, the treatment, except in this particular, being continued as before. The result was not only much more decided relief from the distress occasioned by the disease, and a more marked alteration in its appearance, but the ointment was praised as a much more agreeable application. A short time after this alteration had been made, the ointment, whose color was masked by the presence of other ingredients, was accidentally made up by her chemist with the nitric oxide; and there being nothing in its appearance to indicate the difference, it was used as before, but she complained that it seemed to have lost much of its efficacy, and the appearance of the diseased skin confirmed her statement. On examining the ointment and making inquiry of the dispenser, the cause appeared.



I mention this case, since it affords an instance where neither patient nor practitioner were aware of a change until it declared itself by its effects, and where a difference (in favor of the yellow oxide) was first noticed by a person who, having no theory to prove, was perfectly free from all prejudice.

I have since then frequently tried in appropriate cases ointments containing merely one or the other of the oxides, and the result has been uniformly in favor of the precipitated yellow oxide of mercury.

Dr. Attfield said, that not the least important point in any proposition to introduce a new substance into pharmacy was the character of the name by which it was designated. Mr. Squire had brought before their notice two varieties of the red oxide of mercury; one prepared by the old method of heating nitrate of mercury, the other by precipitation of solution of corrosive sublimate by potash. Mr. Squire had apparently experienced some difficulty in distinguishing between these varieties, and had not yet succeeded in stating the true distinction. The fact was that the old kind was perfectly free from water, while that precipitated from solution contained twenty per cent.; the one was *anhydrous red oxide*, the other *hydrated red oxide*.

Mr. Daniel Hanbury said that the house with which he was connected had many years since prepared for a well-known practitioner in skin diseases a similar ointment to that now suggested by Mr. Balmanno Squire, but the old sort had been returned to. —*London Pharmaceutical Journal*, April 1, 1865.

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#### NOTES ON IODIDE OF POTASSIUM, ETC.

By MR. WILLIAM HUSKISSON, JUN.

The "Pharmaceutical Journal" for October last contains an interesting report by Mr. Clayton, in which he forms a comparison, based upon quantitative and qualitative analysis, between the relative values of English and Foreign Iodides of Potassium. The impurities in the commercial English iodide may be fairly considered as accidental. The chloride of potassium is derived from the American pearlashes employed in the process which,



as is known, is never free from chloride, and the removal of traces of this salt is often attended with much difficulty, so much so, indeed, that even highly bicarbonated potash recrystallized often contains traces of it. I suggested a process some time since for getting iodide of potassium free from chloride by decomposing sulphate of potash with iodide of calcium. With reference to the moisture it will be observed that cubic iodide of potassium nearly always contains free alkali, which secretes itself between the interstices or plates or in the cells that form the cubes or crystals, and does not entirely separate when the salt is left to drain for a considerable length of time. A temperature of  $212^{\circ}$  also fails to abstract this moisture. On a large scale the crystal is submitted to a temperature of upwards of  $300^{\circ}$  for many hours. After this application, if they are reduced to powder and submitted to a still higher temperature, they do not lose weight, but if the heat be gradually increased to the fusing-point, a loss is at once perceptible, and the salt indicates the presence of iodate of potash. If these crystals are kept for a length of time or exposed to the air, the deliquescent alkali contained in the interstices will attract sufficient moisture to account for the percentage estimated in Mr. Clayton's analysis *in most instances*. When much care is bestowed upon the preparation of this salt the crystals possess great beauty, occurring in opaque or ivory-white cubes or blocks, sometimes in flat plates or slabs, weighing from a few grains to several ounces each. The opacity, transparency, and size of the crystal are entirely in the hands of the manufacturer; but under any circumstances the crystals are never perfect, one or more of the faces or sides of the cube being always imperfect. After operating upon large quantities with unremitting care and adopting every contrivance, I never succeeded in producing a perfect cube. If the imperfect side of one of these cubes be placed upwards in a glass tube, and heat applied, the form of the crystal can be preserved and the moisture, if required, estimated (*this side being composed of the edges of the plates between which the steam can escape;*) but if, on the other hand, the imperfect face of the cube be placed downwards and weighed on a platina or porcelain dish, on the very careful application of heat the cube will be shattered or cleaved into thin

plates or small cubes, it is therefore evident if these crystals were not porous or one or more of the faces imperfect, the salt could not be rendered anhydrous without the crystals or cubes being shattered to pieces. The fineness and beauty of the shell that surrounds the sides of the cube will not allow the steam formed to escape on the application of heat. If one of the plates separated by heat or cleavage be examined under the microscope, a saline body will be observed to be dried on the ivory surface. If this surface be moistened with a slight breath of steam, upon the application of turmeric paper, a brown impression will be left upon the paper, and the whole of the alkali may be thus removed from both surfaces, and the thin plate or beeswing left will be found to be neutral, although if the crystals be dissolved in water they will scarcely give an alkaline reaction.

The entire absence of bromine in all the samples of iodide examined by Mr. Clayton seems remarkable, as we find bromine associated with iodine in much of the fucus and ulva used in the manufacture of kelp; and as British manufacturers do not collect or separate the bromine, the question arises, what becomes of it?

I had occasion to remark some time ago, that when testing bromide of potassium for the detection of iodide, starch failed readily to indicate iodide in an alkaline solution. This fact has been long since known with regard to ozone. To be perfectly sensitive to the influence of ozone the cubic iodide requires to be exactly neutralized by hydriodic acid.\* From a neutral solution the salt then crystallizes in nearly transparent or pale-yellow octohedrons, with rhombic bases, or similar in geometrical form to iodine when crystallized from an alcoholic solution or separated by sublimation. I drew attention to the value of this neutral iodide some years ago in photography, and it has since become a commercial article amongst photographers. With regard to the iodate often contained in some of the French or foreign iodide, I believe it to be partly due to the processes they adopt differing from those of the manufacturers of this country. Hitherto the French have been enabled to produce iodine at a

\* The foreign iodide does not answer for this purpose, as it often contains iodate of potash.

less cost than the English manufacturer, arising principally from the great value of chloride of potassium in France, the chloride being a secondary product in the manufacture of iodine. Recently, however, the Emperor of the French has taken the duty off chloride of potassium, and this, together with the late discovery of an island, the superstratum of which is entirely composed of almost pure chloride of potassium, while the strata below consist of chloride of sodium, etc., will seriously affect the value of the chloride of potassium produced in the manufacture of iodine. Under these circumstances it is generally believed that this important branch of industry will be to some extent transferred to this country. Iodine for many years past has been a favorite article with wealthy speculators for the investment of large capital, and it has ranged from  $3\frac{1}{2}d.$  to  $2s. 8d.$  per ounce in a few months. About two years since it fell to  $3\frac{1}{2}d.$  per ounce, which was supposed to be owing to the ingenious and economical process of Mr. Stanford. By the old process one ton of seaweed would only yield from eight to fourteen *pounds of iodine*.

Formerly commercial iodine contained a large percentage of moisture, and on keeping the iodine for twelve months this loss sometimes amounted to 10 lb. in a cwt., a great deal of which was absorbed by the staves of the casks or passed through them and was lost. The moisture is generally estimated by pressing the iodine between folds of blotting-paper, and the appearance of the paper indicates the amount of moisture present. Iodine sometimes contains iodide of cyanogen, which rises in fine white needles when the iodine is heated. This is an accidental impurity produced by one of the processes sometimes adopted in the manufacture. Iodine has been adulterated to some extent with manganese, alumina, sand, etc., although this is not of frequent occurrence. A quantity of iodine purchased some weeks since was found, on examination, to contain in each keg of 100 lb. 2 lb. of a substance or adulteration which was proved to be furnace drift, or the substance found in the flues of steam-boilers. This claim was not allowed by the seller, owing to the iodine having been approved on inspection without testing. This may be of some value to buyers of iodine. The facility and perfection by



which the salts of iodine are produced, their rich and varied colors, and striking geometrical form, render them of more than ordinary interest to the chemist: as a few illustrations of this may be mentioned, sublimed iodide of arsenic,\* so closely resembling the leaf of the seaweed, the rich sable plumes of iodide of sulphur,† biniodide of mercury, and the truncated crystals of iodide of ammonium.—*London Pharm. Jour.*, July, 1865.

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#### PHENIC VINEGAR.

Dr. Quesneville gives the following recipe for an *antipestilentiel*. Take acetic acid, (5°,) 900 grammes; camphor in powder, 5 grammes; crystallized phenic acid, 100 grammes. This combination of three antiputrescents is said to be extremely useful, and for hygienic purposes far superior to *vinegar of the four thieves*, as toilet vinegar was once called. It has been used a good deal on board ship to keep the cabins of sick persons sweet.—*Moniteur Scientifique*, 1865, p. 515, from *Chemical News*, London, June 23, 1865.

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#### REACTIONS OF GELATIN.

By M. CAREY LEA, Philadelphia.

I have been occupied at times for some years past with the study of this very interesting substance, and propose here to describe a new reaction which I have observed, and which constitutes, I believe, the first colored reaction described as produced between pure gelatin and a perfectly colorless reagent. It is true that the precipitate produced in gelatin solutions by gallotannic acid is much deeper in color than the precipitant; but the straw-yellow color of gallotannic acid naturally leads to the expectation of colored combinations, whereas in the case I am about to mention, the precipitant is colorless, and the production of a marked color seems to point to a more complete action than that of simple combination.

\* When sublimed in vessels containing air the sublimate will be interspersed with crystalline tufts of arsenious acid.

† This sublimate only contains 3 per cent. of sulphur, according to Rose.



When a piece of gelatin is dropped into an acid solution of pernitrate of mercury, it gradually assumes a strong red coloration, and, after a time, dissolves in it completely, at ordinary temperatures, to a fine red solution. This solution deepens a little if boiled for some minutes. By chlorate of potash, the hot solution is quickly decolorized, and passes to pale dirty yellow.

This red coloration seems to require a certain amount of time for its production, which cannot be replaced by heat. If a piece of gelatin be immersed in the solution of protonitrate and boiled for some minutes, it is dissolved, but the solution thus obtained is not red, but yellowish.

It is to be regretted that the reaction here described is not more delicate. It is only striking when tolerably strong solutions of gelatin are employed. When the solution is very weak, as, for example, if the gelatin constitutes only one-half of one per cent. of the mixed liquids, the limit of the delicacy of the test is reached. Such a solution, by standing twenty-four hours, exhibits a light but distinct pink color. Although this delicacy is not what may be desired, still, colloid organic substances are so comparatively difficult of qualitative detection as a general thing, that the method is not without value.

The experiment was next extended to *metagelatin*. A neutral metagelatin was prepared in the following manner:—

Gelatin was set to swell in cold saturated solution of oxalic acid, and then a moderate heat was applied for a sufficiently long time for the mass to remain quite fluid when cold. It was then agitated with precipitated carbonate of lime until the whole of the oxalic acid was got rid of. Metagelatin prepared in this way was kept for months in a corked vial, in a warm room, without showing any disposition to putrefy. It was almost as fluid as water: perfectly neutral and almost insipid to the taste.

With this metagelatin, the red coloration was produced even more decidedly than with ordinary gelatin. The addition of the acid solution of pernitrate of mercury produced at first a whitish flocculent precipitate, which, by standing, acquired a strong red color, as did the supernatant liquid.—*Amer. Journ. of Science and Arts*, July, 1865.

## ON A CONVENIENT PROCESS FOR PREPARING OXYGEN.

By M. FLEITMAN.

The easy preparation of oxygen for technical purposes is a matter of considerable importance, and I now shortly describe a process which possesses particular scientific interest. I was led to the process by observing that on heating a concentrated solution of chloride of lime with only a trace of freshly prepared moist peroxide of cobalt, \* the hypochlorite of lime was completely decomposed into chloride of calcium and oxygen. Repeated quantitative experiments, the results of which I have lost, convinced me that the whole of the oxygen was evolved, and that only chloride of calcium and no chloric acid was formed.

The evolution of oxygen commences about  $70^{\circ}$  or  $80^{\circ}$ , and continues in a regular stream, with a slight frothing of the liquid.

The action of the peroxide of cobalt in this case, it is clear, is exactly like that of nitric oxide in the manufacture of sulphuric acid. There is no doubt that several peroxides of cobalt with various proportions of oxygen exist. My own experiments have shown me that the proportion of oxygen in peroxide of cobalt is variable, and the simplest explanation of this process is that a lower peroxide abstracts oxygen from the hypochlorite of lime to form a higher oxide, which is again decomposed into a lower oxide and oxygen.

The peroxide made use of in one experiment may be employed again to decompose a fresh quantity of hypochlorite of lime. From one-tenth to one-half per cent. is sufficient to effect the reaction; and instead of taking the freshly prepared hydrated peroxide, it will suffice to add to the solution of hypochlorite a few drops of a solution of cobalt salt, whereby a corresponding amount of the peroxide is formed.

The advantages of this method of procuring oxygen appear to be the following:—

1. The evolution proceeds with extraordinary regularity, and the gas is collected with the greatest ease, which makes the pro-

\* Peroxide of nickle acts in a similar way, but not so energetically.

cess specially applicable as a lecture experiment. When the mixture has been heated to 70° or 80° the lamp may in general be removed, as the heat of the fluid is then sufficient to carry on the reaction to the end.

2. The *whole* of the oxygen is obtained from the material, while only a part is procured by heating peroxide of manganese, and

3. The process has the advantage of greater cheapness than that with chlorate of potash (either with or without manganese).

It is necessary to employ a clear solution of chloride of lime, as a thick or murky solution will froth over. The best way of making a clear and strong solution is by first extracting one portion of chloride of lime with water, decanting the clear liquor, and then make use of that to exhaust another portion of the chloride. In this way it is easy to get a liquor which will evolve from twenty-five to thirty times its volume of oxygen. On the small scale it is best to employ a capacious flask, which may be about seven-eighths filled with the solution. On a large scale for technical purposes a sort of steam boiler might be used, and the oxygen so obtained under pressure, and capable of being employed as a blast.

In a note the author suggests that a very pretty experiment may be made to show the displacement of oxygen by chlorine, by passing the latter gas into a mixture of solution of caustic soda with some peroxide of cobalt. The chlorine could be passed in on one side, and oxygen collected at the other.—*Chem. News*, Lond., June 2, 1865, from *Annalen der Chemie und Pharmacie*, April, 1865, p. 64.

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#### CASE OF POISONING BY VERATRUM VIRIDE.

[Read before the Middlesex East District Medical Society, and communicated, by the Secretary, for the Boston Medical and Surgical Journal.]

By J. C. HARRIS, M. D., OF WEST CAMBRIDGE.

J. C., aged 1 year and 6 months, was attacked with pneumonia, from which he made a good recovery, the chief remedy in the active stage being veratrum viride—the dose being four drops of the tincture, repeated every four hours. When the child

ceased taking the veratrum, there remained forty or fifty drops mixed with water, in the proportion of four drops to a teaspoonful, which the mother saved for future use, keeping it in a cup four or five days, then pouring it into a bottle. About six weeks after this, the child caught cold, was feverish, and had some difficulty in breathing. The mother commenced giving the veratrum every half hour, in teaspoonful doses of the mixture she had saved, until four or five doses had been given; a tablespoonful was given for one dose by mistake. The whole quantity taken was probably not less than thirty-five drops, for the four or five days' evaporation must have increased the proportionate strength of a dose at least one drop.

There was an effort to vomit after the second dose, but without ejecting anything from the stomach. Efforts to vomit were made every few minutes, but without success, except once, when a small quantity passed from the mouth. I was called to the child about seven hours after taking the first dose. I found him apparently unconscious, very pale, breathing heavy—almost stertorous; pulse 40, extremities cold, and a profuse cold perspiration over the whole body. These symptoms I supposed were the result of the large doses of the veratrum. I made no attempt to remove the contents of the stomach, but ordered mustard paste to be applied to the chest, abdomen and extremities, and carbonate of ammonia and camphor—three grains of the former to one of the latter—every hour, and a drachm of brandy intermediately. This treatment was kept up until the child died, about thirteen hours after taking the first dose of the veratrum.

REMARKS.—This child had always been feeble, and his mother was in the habit of frequently dosing him for real or imaginary sickness. It is possible, if not probable, that the result would have been different had there been free emesis within an hour or two after taking the medicine. I did not attempt to remove the contents of the stomach, for the case seemed almost hopeless when I first saw it.

This is the first case of death from an overdose of veratrum viride I have seen or heard of, and therefore it is possible I did not pursue the best course of treatment.



NOTE BY THE SECRETARY.—This case is very interesting, from the fact that it is the first well-authenticated case of poisoning from the use of the *veratrum viride*. It did not result from its legitimate employment under the direction of a physician.

Another point of interest is the fact that the alkaloids suspended in water should keep their strength for six weeks. Those who are familiar with the action of the *tinctura veratri viridis* with water know that, on keeping a few days, a dirty, unpleasant-looking sediment is deposited in the bottom of the vessel, which has usually led to its rejection as worthless.

Still another point is the absence of free vomiting. Perhaps the nature of the drug might have been so changed as to have impaired the emetic without destroying the sedative properties.

The relation of this case should not hinder any from administering the *veratrum* when it is indicated. It must have been given tens of thousands of times, but this is the first well-authenticated case of death that has come to the knowledge of the *Veratrum Viride* Committee of this Society. The *veratrum viride* is used at present by the members of this Society, and the confidence in it has grown with its use as the most reliable arterial sedative known to us.

*Woburn, March 24, 1865.*

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#### ON THE RATE AT WHICH DIFFERENT LIQUIDS FLOW THROUGH SYPHONS.

BY JOHN GALLETTY.

In a note of Dr. Ure's, curiously gathered, I believe, by Prof. Hunt into his Dictionary of Arts, &c., I have seen it stated that Dr. Ure had tried the rate at which water, sulphuric acid, and rape oil flowed from a platinum vessel through a small platinum syphon. He found these fluids to run off at very different rates, but his exact numbers I cannot at present lay my hands on. The obvious difference in viscosity of the liquids employed seems to have generally been considered sufficient to account for his results. I have found, however, such differences between liquids apparently of about the same degree of limpidity as to lead me to the belief that this method of examining an important property of these fluids is worthy of attention.

As an illustration, I may give the periods required to draw off the liquids named in the following table by a syphon of somewhat narrow quill tubing from a phial holding a little more than 4 oz.; the position of syphon and temperature (60° F.) being the same in all cases:—

Water,	.	.	.	.	.	74 seconds
Ether,	.	.	.	.	.	48 “
Bisulph. carbon.,	.	.	.	.	.	47 “
Whiskey, 914 sp. gr.,	.	.	.	.	.	182 “

Here it will be seen that the differences are somewhat remarkable, and although this was rather a narrow syphon, the following results will show that the variations can be as great by employing the tubing in common laboratory use for drawing off the liquids over precipitates, &c. Poiseuille, by employing capillary tubes and somewhat elaborate apparatus, has obtained similar results, and of greater scientific accuracy, of course. Professor Graham has likewise employed capillary tubes in his valuable experiments “On Liquid Transpiration,” but the much greater ease with which one can compare the flow of separate liquids by means of a common bottle and syphon may not be without its use, and especially as a guide to interesting results in more elaborate investigations.

The narrower the syphon the greater difference is always found between the rate of efflux of various liquids. I will not give any illustration of this statement, as numerous experiments uniformly confirmed it. The same is the case when the long limb of the syphon approaches the level of the short one. As an indication of the differences to be obtained by more nearly equalising the syphon limbs, I will quote the following experiments:—

The bottle employed held 7300 grs. water, was about  $4\frac{1}{2}$  inches deep, syphon a little over  $\frac{1}{4}$ th inch bore nearly uniform throughout. In experiments in first column long limb  $18\frac{1}{2}$  inches longer than short limb; 2d column  $9\frac{1}{8}$ th inches was cut off long limb; 3d column  $9\frac{1}{8}$  inches more cut off long limb, leaving it only  $\frac{1}{4}$  inch below level of short limb. Temperature in all cases 60° F. On repeating the same experiment twice, seldom more than one second difference was obtained.

	Sp. gravity.	First experiment. Seconds.	Second experiment. Seconds.	Third experiment. Seconds.
Water, . . . .	1000	49	60	212
Paraffine oil, . .	826	79	—	516
Boghead naphtha, .	765	49	59	221
Turpentine, . . .	876	57	79	334
Whiskey, . . . .	914	85	120	515
Petroleum, . . .	812	83	—	549
Turpentine and naphtha,				
half of each, . . .	825	48	64	249

It is curious to observe in the above table that although naphtha runs through the first syphon in a considerably shorter time than turpentine, that a mixture of these liquids in equal proportions flows at a slower rate than even the naphtha by itself. This is not observed as the syphon limbs get more nearly equal. The cause is evidently the greater weight of liquid in the long limb drawing it faster over without the viscosity being increased proportionately.

Experiments were made with wide and narrow syphons adjusted to empty a bottle of water in the same time, to see whether other liquids would also flow through them in an equal time, but the numbers obtained were widely different.

I tried also the effect of using a long and short syphon, keeping the ends of the limbs at the same comparative level in both cases. First both limbs were about  $19\frac{1}{2}$  inches long, the long limb being kept  $\frac{3}{8}$ ths inch below the level of the other. In the second experiment  $10\frac{1}{4}$  inches were cut equally off both limbs. This syphon was almost uniform in bore, and  $19^*$  inches in diameter. The same bottle was employed as in former experiments, holding 7300 grs. water.

	First Experiment. Seconds.	Second Experiment. Seconds.
Water, . . . .	179	119
Boghead naphtha, . .	146	103
Turpentine, . . . .	278	160

The value of this method of examining the flow of liquids, even in this rough way, may be illustrated by the following example: Bottle holding 7300 grs. water, syphon same as in third experiments of second table:—

[\* This evidently should be 1-9th inch.—ED. AM. JOUR. PH.]

	Specific gravity.	Seconds.
Paraffine oil, . . .	797	286
Petroleum, . . .	797	375

These experiments I did not mean for publication, but only as preliminary to a larger and more accurate series I intended making, with tubes of as exactly uniform bore as could be obtained, and on a considerable variety of liquids; but I must give up the subject, at least for the present, on account of my distance from a situation where these can be conveniently obtained.

Mandal, Norway.

—*London Chem. News*, March 31, 1865.

#### ON THE CRYSTALLIZATION OF SUPERSATURATED SALINE SOLUTIONS, AND THE NORMAL PRESENCE OF SULPHATE OF SODA IN THE AIR.

BY M. D. GERNEZ.

The crystallization of supersaturated saline solutions is one of the phenomena which has most taxed the ingenuity of chemists to explain; the uncertain circumstances under which it is produced, the variety of causes which appear to determine or prevent it, and the hypotheses put forward, have all contributed to increase the importance of this subject.

Gay-Lussac has shown that a solution of sulphate of soda will remain at the ordinary temperature without crystallizing, even when it contains several times the weight of the salt which it dissolves at this same temperature, but that it forms into a mass when a crystal of sulphate of soda or certain substances previously exposed to the air are thrown into it, or when the liquid is abruptly placed in contact with the air. Many chemists (Lœwel, Selmi, Goskinski, &c.) have varied and extended Gay-Lussac's experiments; they have brought to bear on the explanation of this phenomenon sometimes water vapor, sometimes atmospheric air, or an unknown substance, or glass vessels in a particular state, or finally a catalytic force. I believe I have shown that the crystallization of a supersaturated solution of sulphate of soda is effected by contact with a fragment, efflorescent or not, of sulphate of soda, of ten equivalents of water. This appears to me to be the result of a number of experiments of which I can here indicate only the most important.



I. *The Crystallization of the Supersaturated Solution of Sulphate of Soda is Determined by the Fall of a Solid Body.*—

We know that supersaturated solutions exposed to the air in a laboratory always end by forming into a mass. By varying the experiments, I have ascertained the conditions necessary for the crystallization. It is always produced in matrasses or flasks, if the dust in the air will by falling vertically encounter the surface of the liquid. I found that in the same place the crystallization is much more rapid where the surface directly in contact with the air is largest, or where the air has easiest access; it is very slow where the orifice is narrow, in which case it always begins at one point, whence it extends in all directions in the form of radiated needles; and if, for instance, this takes place in a balloon with a straight neck, this point is invariably in the horizontal projection of the orifice.

By inclining the neck of the balloon or matrass containing the liquid while still hot, or by leaving in the usual position a retort filled with the liquid, no crystallization takes place. It would, then, seem necessary that the corpuscles of the air should be able to reach the surface of the liquid in their vertical fall.

Several experiments, especially Lœwel's, would have led to the opinion that crystallization is due to the presence of a solid body in the air, had not other, and apparently contradictory, experiments been made. Thus air which has traversed cotton or starch no longer determines crystallization. I have found that all causes which arrest the movement of the solid bodies in suspension in the air produce the same effect. To ascertain this I merely repeated with supersaturated solutions the experiments made by M. Pasteur with putrescible liquids; among others, the experiment with balloons with sinuous necks.

Finally, hardly perceptible dust deposited on any body put in contact with a supersaturated solution always determines its solidification. It is the same with a thick layer of dust.

II. *The Solid Body Determining the Crystallization is Soluble in Water.*—In a second series of experiments I found: 1. That the bodies determining the crystallization of the supersaturated liquid lose their property when washed in ordinary water and dried, when cooled in flasks having a layer of sulphuric acid at

the bottom. In the same way, dust slowly dried after being washed becomes perfectly inactive.

2. I passed into a saturated solution, which had remained intact, more than 1500 litres of air washed in distilled water, and, to use the least possible quantity of water, I passed the air through a series of inclined glass tubes, in each of which a drop of water uplifted by the bubble of air rose the length of the tube, diminishing in volume, and forming again in the lower part of the tube, thus serving an indefinite number of times.

3. A layer of oil poured on a solution of sulphate of soda preserves it from contact with the air and prevents its crystallizing. In place of oil I employ a layer of water, when no crystallization is produced by plunging a rod into the solution; at least, if this is done very rapidly, and there is no thick coating of deposited matter on the rod, in which case should a morsel fall into the solution and not be completely dissolved, the solution will be crystallized before the rod has touched the supersaturated solution.

III. *The Solid Body Determining the Crystallization loses its Property under the Influence of Heat.*—I verified this fact, which has long been established.

IV. *The Air which Determines Crystallization contains Sulphate of Soda.*—I collected the few drops of water which had washed the air in the inclined tubes in experiment section II., and which contained the soluble matters of more than 1500 litres of air; they gave, with chloride of barium, a precipitate of sulphate of baryta; one drop of liquid gave, with the spectroscope, the soda ray with remarkable intensity.

Dust deposited even out of the laboratory, treated by distilled water, gave a lixivium presenting the same reactions, and contained considerable quantities of soda and of a soluble sulphate.

In short, the crystallization of the supersaturated solution of sulphate of soda is determined by the contact of a solid body soluble in water, alterable under the influence of heat, giving with chloride of barium a precipitate of sulphate of baryta, and containing soda; these are exactly the characteristics of ordinary sulphate of soda, which would then determine the crystallization of its supersaturated solutions.

But does no other substance possess this property? To clear up this synthetic side of the question, I tried the action of a great many substances. Among two hundred and twenty I found thirty-nine possessing this property; of these, eighteen were insoluble. I washed them in distilled water, and left them on filters shielded from the dusts in the air; when, after a few days, they were dry, I found them without action on the solution which they previously crystallized. Moreover, the lixivium gave, with chloride of barium, a precipitate of sulphate of baryta, and contained soda. The twenty-one soluble substances I purified by recrystallization with or without the addition of chloride of barium. Not one of them preserved its action on the supersaturated solution. These results lead me to believe that sulphate of soda is the only substance which acts on the supersaturated solution.

Let us now consider the action of the air in Gay-Lussac's experiment with a tube, as it is ordinarily made. If the conclusion at which I have arrived be correct, it is necessary that a particle of sulphate of soda should penetrate with the air into the tube, and so determine the crystallization. Now it seems difficult to admit that in the limited volume of air entering into the tube there should always be a particle of sulphate of soda, but this experiment succeeds, at the most, once in six times, when the precaution is taken of washing the fine end of the tube and the pincers which serve to break it and to keep it at a distance. If it is generally most successful in the lecture room, it is because the current of air takes with it particles of sulphate of soda which have been thrown from the tube during the boiling of the liquid, and which have become attached to the outer surface, and there crystallized. However, this experiment is of little use in resolving the question at issue, as it brings into contact with the solution only a very small volume of air. It is better to pass air very rapidly (one litre per minute) into a supersaturated solution; then, while in the laboratory, a quarter of a litre is sufficient to determine crystallization; in the open country, sixty and even eighty litres are often required. This result, obtained by avoiding all the causes which might accidentally introduce sulphate of soda, makes the existence of sulphate of soda in the air more and more probable.



There is, moreover, nothing extraordinary in the presence of this substance in the air, when we remember that sulphurous acid and sulphuretted hydrogen, produced in the air, are readily transformed into sulphuric acid, and that sea-salt, procured from sea-water, gives, with this acid, sulphate of soda.

Sulphate of soda is not the only substance which can give supersaturated solutions; acetate and carbonate of soda, sulphate of magnesia, &c., have the same property. I am now engaged in studying them, and intend soon to lay the results before the Academy, and hope to be able to deduce from them an analytical process applicable to substances suitable for supersaturation, by which their presence, even in infinitesimally small quantities, may be ascertained. All the dusts which I have assayed, and which contain crystallized sulphate of soda, have been actionless on the acetate, this salt being in fact very rarely present in the air.

I had the honor of assisting M. Pasteur in his experiments, at the Museum of Natural History, relative to generations called spontaneous. There I first thought of studying supersaturated solutions; their crystallization being, as I believe I have proved, attributable to the action of particles of sulphate of soda held in suspension in the air, or deposited on the surface of bodies, there will doubtless be great similarity either in the mode of experimenting, or in the results, between my work and that of M. Pasteur, relative to the inferior germs of organization.—*Compt. Rendus*, lx. 833, from *Chemical News*, London, June 23, 1865.

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#### ON THE VEGETABLE ORIGIN OF DIAMONDS.

We have already mentioned that Professor Goeppert obtained the prize offered by the Dutch Scientific Society for an Essay on the vegetable origin of Diamonds, and we are now able to give a short abstract of this highly interesting essay.

Since Lavoisier showed that diamonds were composed of pure carbon, very different opinions have been entertained about their origin, some believing them to be produced by Plutonic, others by Neptunian agency. Newton inclined towards the latter view, and Brewster agrees with him. In 1842 Liebig pronounced the



formation of diamonds to be the result of an uninterrupted process of chemical decomposition. "Imagine this chemical decomposition taking place in a fluid rich in carbon and hydrogen, and you have a combination still richer in carbon, out of which will issue, as a final result of its chemical decomposition, pure carbon, and that in a crystallized form." Indeed, a high temperature is adverse to the formation of diamonds, as diamonds become black when subjected to a high degree of temperature, and, according to Despretz's experiments, they are even converted into graphite and coke. The black diamonds, or so-called "carbonates of Bahia," are in part a mixture of uncrystallized carbon and diamonds, as shown by the process of combustion, to which, at my desire, they were submitted by Professor Löwig. That diamonds originated under Neptunian agency is further proved by the frequent occurrence of crystals in them. I have seen them in hundreds of different specimens, and even small cavities containing them. In my essay I have given ample proof that at one time diamonds were soft bodies. Hitherto only one diamond, in the possession of the Emperor of the Brazils, has been known, on which the impression of a grain of sand was visible. I have before me a rhombic dodecahedron, on the whole surface of which impressions of grains of sand are visible, and a similar crystal of the black diamond on which the same impressions exist. In a third there is a cavity with bent and broken crystals of an unknown kind. Two others, an octahedron and a rhombic dodecahedron, have on their surface deep impressions of crystals which are not those of diamonds. The Neptunian origin of diamonds can therefore no longer be doubted. G. Bischof also thinks that, after the discovery of iron pyrites in the diamond, any doubt respecting the formation of diamonds in a moist way has been dispelled. In close connection with these observations is the question about the vegetable origin of diamonds, which in a measure was answered by Newton, who regarded them, on account of their great power of reflecting light, long before their true chemical condition was ascertained, to be coagulated fatty or oily bodies. Jameson and Wilson endeavored to prove this theoretically, Petzholdt practically, by the vegetable cells found in the ashes of diamonds. The vegetable origin of coal and anthra-

cite, and their sedimentary formation, having been thoroughly established, I examined, starting from this point, graphite (hitherto regarded as being without structure, but doubtless having a Neptunian origin) and the diamond; and by the experience I have gained from observing, for a number of years, chalcedony and amber, I am able to distinguish sufficiently between mechanical formations and formations of a vegetable origin. I have not yet attained any results with respect to graphite, but in diamonds I have found numerous foreign bodies enclosed, of which, if they cannot be said to be evidently and undoubtedly vegetable in their origin, it would on the other hand be difficult to deny their vegetable nature altogether. The careful figures which will accompany my essay will enable others to judge on this point, and will, if nothing else, open up the way for further researches.—*London Pharm. Journ.*, July 1, 1865, from *Journal of Botany*.

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## RESEARCHES ON BLACK PHOSPHORUS.

BY DR. BLONDLOT.

The color of crystallisable phosphorus presents three varieties—it may be white, yellow, or black. The last variety discovered by Thenard can only be reproduced accidentally, and indeed its existence has been doubted by most chemists.

Endeavoring to find out the secret of this preparation, I found that agreeably to Thenard's opinion the color of phosphorus owes its degree to the way in which it is cooled after having been melted.

Phosphorus is, as we know, purified by distillation. I perform this operation in a current of hydrogen by means of a small tubular retort, heated in a sand bath, and adapted to a flask half full of water, resting at the bottom of a large vessel filled with water at 70°. On dismounting the apparatus there is usually found a certain quantity of red phosphorus at the bottom of the retort. Now from what I have observed it is in the production, and in the successive elimination of the latter that the conversion of ordinary yellow into white and reputed pure phosphorus con-

sists. I also found that to insure success in bleaching phosphorus by repeated distillations, it is necessary between each operation to submit it to insolation in glass tubes, so as to convert the yellow part which is volatile into red phosphorus, which is fixed. When bleached in this way phosphorus has a strong tendency to turn suddenly black. Rapid cooling may produce this effect, as Thenard has shown; he obtained this result by melting his phosphorus in fine tubes, which he then plunged into cold water. Melted again, the black phosphorus thus produced lost its color, and did not regain it till it had been rapidly cooled. Hence it has been inferred that black phosphorus is the result of a kind of tempering. This is an error, for I have obtained it more easily in quite a contrary way—that is to say, by very gradual cooling. In this way I habitually procure black phosphorus. For this purpose I distil phosphorus, previously insolated, until the product collected in the balloon very slowly cooled in the water-bath suddenly turns black. This curious change generally takes place in the following manner:—When the temperature has fallen to about  $44^{\circ}$ , the phosphorus solidifies in the usual way into a white mass; then, when after several hours the water is only at  $5^{\circ}$  or  $6^{\circ}$ , the phosphorus suddenly—in the space of a second—turns to a beautiful black. Black phosphorus, when once obtained, may be re-melted and re-distilled without fear. When liquid it is colorless, but returns to black by very slow cooling. It presents, moreover, all the characteristic properties of ordinary phosphorus, except that it is softer.

It follows from the above researches that as yellow phosphorus is recognized as impure, and as the white is but a transitory state before arriving at the black, the latter, much more stable, should be considered not as an anomaly, but, on the contrary, as the true type. A support for this opinion is to be found in the fact that phosphorus which has been long exposed to diffused light, and has become covered with a layer of red, is found to be black inside, as though, in becoming spontaneously purified, it had undergone a molecular change somewhat analogous to crystallisation.—*London Chem. News*, June 16, 1865, from *Comptes Rendus*, lx. 830.

## LIQUOR AMMONIÆ ACETATIS.

BY THOMAS BYRNES, M.D.

There is scarcely any preparation of the pharmacopœia that will be found to vary so much as the liquor ammoniæ acetatis.

This variation arises from its mode of preparation, it nearly always being too alkaline or too acid; physicians observe this, and sometimes complain of it. I once saw a prescription for this remedy, to which was appended the following caution, "be sure and get this mixture neutral, as its being alkaline would seriously injure the patient." I knew another physician who always required this medicine to be brought to him before he would allow the patient to use it.

Liquor ammoniæ acetatis is directed to be made by adding carbonate of ammonia to diluted acetic acid until it is saturated.

But here arises the difficulty, for each druggist has his own favorite method of determining this point; some tell best by the taste, others by its ceasing to effervesce on the addition of carbonate of ammonia. I know of one druggist who always determines the point of saturation by listening to the vessel in which it is being prepared.

Others again, who are more scientific, rely upon test paper, but all of these means generally fail to give a neutral solution of the acetate of ammonia.

Taste may indicate if the solution contains too much of the acid or alkali, but it cannot determine its point of saturation.

Adding ammonia until effervescence ceases is very fallacious, as quite a large quantity of free alkali may be taken up before effervescence ceases, especially if the carbonate has been rapidly added.

Test paper it is very certain cannot be relied upon, and unfortunately we cannot weigh out the quantities so as to exactly neutralize each other, owing to the variable strength of acetic acid, and carbonate of ammonia, much of the latter article often being a bicarbonate as found in the shops, especially if it has been long kept.

It is well known that the acetates, though neutral in composi-



tion, are alkaline to test paper, hence test paper cannot be used to determine the point of saturation. There is also another objection to using test paper; so much of the carbonic acid may be absorbed by the solution, as to give an acid reaction even when the solution is alkaline, as may be proved by setting the mixture aside for a few hours. If test paper is now applied, an alkaline reaction is at once manifested, and the solution has a distinctly ammoniacal odor and taste.

To remedy this source of fallacy, it has been recommended to heat the solution, but here there is danger of error also, for if the heat be too long applied it drives off the ammonia, and a binacetate is the result.

These are difficulties which every one will experience, who observes carefully while making this preparation.

As often kept in the shops it is not liquor ammoniæ acetatis, but a mixture of it, and carbonate of ammonia.

There are two ways in which this remedy may be prepared so as to obviate the difficulties above mentioned; both methods I have tried, and they each yield perfectly satisfactory results.

One method is to neutralize the acetic acid with carbonate of ammonia before diluting it with the water, the other is to neutralize diluted acetic acid with aqua ammoniæ.

By adding carbonate of ammonia to undiluted acetic acid (No. 8,) the point of saturation is easily determined. This plan gives a concentrated solution of the acetate, which dissolves the carbonate but very slightly after it is once saturated, and no carbonic acid is held in solution. When making it from undiluted acetic acid the carbonate may be added until effervescence ceases, and then dilute it with pure water free from lime.

It may be prepared from aqua ammoniæ by diluting the acid to half its usual strength, as allowance must be made for the water of the aqua ammoniæ. After the acid is thus diluted, carefully add the water of ammonia until the solution is neutral to test paper, and dilute to its proper strength.

A few drops of acetic acid may be added with advantage, if the solution is to be kept, though it is always better to prepare it as it is dispensed. If kept, free carbonate of ammonia is soon generated, and the mixture becomes alkaline.

When prepared by either of the above methods, spirits of mindererus is a colorless liquid, of a sweetish saline taste, very agreeable to patients suffering from fever; the solution should not yield a precipitate with nitrate of silver, chloride of barium or acetate of lead, nor be darkened by sulphuretted hydrogen.—*Med. and Surg. Reporter*, July 15, 1865.

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#### ON THE ANTAGONISM OF ATROPIA AND MORPHIA, &c.

By Drs. WEIR MITCHELL, KEEN AND MOREHOUSE.

The foregoing experiments and observations authorize us, we think, to draw the following conclusions as to the use of hypodermic injections, and as to the antagonism of atropia and morphia:—

1. Conia, atropia, and daturia have no power to lessen pain when used subdermally.

2. Morphia thus used is of the utmost value to relieve pain, and is most potent, in certain forms of neuralgia, the nearer it is applied to the seat of the suffering.

3. Morphia lowers the pulse slightly or not at all; atropia usually lowers the pulse a few beats within ten minutes, and then raises it twenty to fifty beats within an hour. The pulse finally falls about the tenth hour below the normal number, and regains its healthy rate within twenty-four hours.

4. Morphia has no power to prevent atropia from thus influencing the pulse, so that, as regards the circulation, they do not counteract one another.

5. During the change of the pulse under atropia, the number of respirations is hardly altered at all.

6. As regards the eye, the two agents in question are mutually antagonistic, but atropia continues to act for a much longer time than morphia.

7. The cerebral symptoms caused by either drug are, to a great extent, capable of being overcome by the other, but owing to the different rates at which they move to affect the system, it is not easy to obtain a perfect balance of effects, and this is made the more difficult from the fact already mentioned, that atropia has the greater duration of toxic activity.

8. The dry mouth of atropia is not made less by the coincident or precedent use of morphia. Atropia does not constipate, and may even relax the bowels; morphia has a reverse tendency.

9. The nausea of morphia is not antagonized or prevented by atropia.

10. Both agents cause dysuria in certain cases, nor is the dysuria occasioned by the one agent relieved by the other.

11. Atropia has no ability to alter or lessen the energy with which morphia acts to diminish sensibility or relieve the pain of neuralgic disease.

12. As regards toxic effects upon the cerebral organs, the two agents are mutually antidotal, but this antagonism does not prevail throughout the whole range of their influence, so that, in some respects, they do not counteract one another, while as concerns one organ, the bladder, both seem to affect it in a similar way.—*Amer. Jour. of Med. Sciences*, July, 1865.

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## Varieties.

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*Patent regenerative Gas-furnaces of C. W. & F. SIEMENS.*—Professor Faraday, in his lecture at the Royal Institution, on the 20th June, 1862, describes these furnaces in the following terms:—

“The gaseous fuel is obtained by the mutual action of coal, air and water at a moderate red heat. A brick chamber, perhaps 6 ft. by 12 ft., and about 10 ft. high, has one of its end walls converted into a fire-grate, *i.e.*, about half way down it is a solid plate, and for the rest of the distance consists of strong horizontal plate bars where air enters, the whole being at an inclination such as that which the side of a heap of coals would naturally take. Coals are poured, through openings above, upon this combination of wall and grate, and, being fired at the under surface, they burn at the place where the air enters; but as the layer of coal is from two to three feet thick, various operations go on in those parts of the fuel which cannot burn for want of air. Thus the upper and cooler part of the coal produces a large body of hydrocarbons; the cinders or coke which are not volatilized, approach, in descending, toward the grate; that part which is nearest the grate burns with the entering air into carbonic acid, and the heat evolved ignites the mass above it; the carbonic acid, passing slowly through the ignited carbon, becomes converted into carbonic oxyd, and mingles in the

upper part of the chamber (or gas producer) with the former hydro-carbons. The water, which is purposely introduced at the bottom of the arrangement, is first vaporized by the heat, and then decomposed by the ignited fuel, and re-arranged as hydrogen and carbonic oxyd; and only the ashes of the coal are removed as solid matter from the chamber at the bottom of the fire-bars.

"These mixed gases form the gaseous fuel. The nitrogen which entered with the air at the grate is mingled with them, constituting about a third of the whole volume. The gas rises up a large vertical tube for twelve or fifteen feet, after which it proceeds horizontally for any required distance, and then descends to the heat regenerator, through which it passes before it enters the furnaces. A regenerator is a chamber packed with fire-bricks, separated so as to allow of the free passage of air or gas between them. There are four placed under a furnace. The gas ascends through one of these chambers, whilst air ascends through the neighboring chamber, and both are conducted through passage outlets at one end of the furnace, where mingling, they burn, producing the heat due to their chemical action. Passing onward to the other end of the furnace, they (*i.e.*, the combined gases) find precisely similar outlets, down which they pass; and traversing the two remaining regenerators from above downward, heat them intensely, especially the upper part, and so travel on in their cooled state to the shaft or chimney. Now the passages between the four regenerators and the gas and air are supplied with valves and deflecting plates, which are like four way-cocks in their action; so that by the use of a lever these regenerators and air-ways, which were carrying off the expended fuel, can in a moment be used for conducting air and gas into the furnace; and those which just before had served to carry air and gas into the furnace now take the burnt fuel away to the stack. It is to be observed, that the intensely-heated flame which leaves the furnace for the stack always proceeds downward through the regenerators, so that the upper part of them is most intensely ignited, keeping back, as it does, the intense heat: and so effectual are they in this action, that the gases which enter the stack to be cast into the air are not usually above 300° F. of heat. On the other hand, the entering gas and air always pass upward through the regenerators, so that they attain a temperature equal to a white heat before they meet in the furnace, and there add to the carried heat that due to their mutual chemical action. It is considered that when the furnace is in full order, the heat carried forward to be evolved by the chemical action of combustion is about 4000°, whilst that carried back by the regenerator is about 3000°, making an intensity of power which, unless moderated on purpose, would fuse furnace and all exposed to its action.

"Thus the regenerators are alternately heated and cooled by the outgoing and entering gas and air, and the time for alternation is from half an hour to an hour, as observation may indicate. The motive power on the gas is of two kinds; a slight excess of pressure within is kept up from



the gas-producer to the bottom of the regenerator to prevent air entering and mingling with the fuel before it is burnt; but from the furnace, downward through the regenerators, the advance of the heated medium is governed mainly by the draught in the tall stack, or chimney.

"Great facility is afforded in the management of these furnaces. If, whilst glass is in the course of manufacture, an intense heat is required, an abundant supply of gas and air is given; when the glass is made, and the condition has to be reduced to working temperature, the quantity of fuel and air is reduced. If the combustion in the furnace is required to be gradual from end to end, the inlets of air and gas are placed more or less apart the one from the other. The gas is lighter than the air; and if a rapid evolution of heat is required, as in a short puddling furnace, the mouth of the gas inlet is placed below that of the air inlet; if the reverse is required, as in the long tube-welding furnace, the contrary arrangement is used. Sometimes, as in the enameller's furnace, which is a long muffle, it is requisite that the heat be greater at the door end of the muffle and furnace, because the goods, being put in and taken out at the same end, those which enter last, and are withdrawn first, remain, of course, for a shorter time in the heat at that end; and though the fuel and air enters first at one end and then at the other, alternately, still the necessary difference of temperature is preserved by the adjustment of the apertures at those ends.

"Not merely can the supply of gas and air to the furnace be governed by valves in the passages, but the very manufacture of the gas-fuel itself can be diminished or even stopped, by cutting off the supply of air to the grate of the gas-producer; and this is important, inasmuch as there is no gasometer to receive and preserve the aeriform fuel, for it proceeds at once to the furnaces.

"Some of the furnaces have their contents open to the fuel and combustion, as in the puddling and metal-melting arrangements; others are enclosed, as in the muffle furnaces and flint-glass furnaces.

"The economy in the fuel is esteemed practically as one-half, even when the same kind of coal is used either directly for the furnace or for the gas-producer; but, as in the latter case, the most worthless kind can be employed, such as slack, &c., which can be converted into a clean gaseous fuel at a distance from the place of the furnace, so, many advantages seem to present themselves in this part of the arrangement."

Faraday concludes his lecture with the following conclusive figures:—

"Carbon, burnt perfectly into carbonic acid in a gas-producer, would evolve about  $4000^{\circ}$  of heat; but, if burnt into carbonic oxyd, it would only evolve  $1200^{\circ}$ . The carbonic oxyd, in its fuel form, carries on with it the  $2800^{\circ}$  in chemical force, which it evolves when burning in the real furnace with a sufficient supply of air. The remaining  $1200^{\circ}$  are employed in the gas-producer in distilling hydrocarbons, decomposing water, &c. The whole mixed gaseous fuel can evolve about  $4000^{\circ}$  in the furnace, to which the regenerator can return about  $3000^{\circ}$  more."—*Amer. Jour. of Sci. and Arts.*

*Use of Opium in the United States.*—A writer in the *New York Journal of Commerce* has been making some investigations into the annual imports of opium into the United States since 1840. He says that:—

“While \$40,874 paid the foreign cost of all the opium imported at the ports of the United States in 1840, it took \$932,887 to pay the cost in the year ending June 30, 1862,—an increase from forty thousand to nearly one million of dollars in less than twenty-five years.

“Of the large sum last mentioned, 30,482 pounds, valued at \$96,174, were landed at Boston; 163,055 pounds, valued at \$554,443, at New York; while the value of \$281,796, mostly ‘prepared’ opium, was landed on the Pacific, chiefly for the use of the Chinese in California. It is true that the medical business connected with the army is responsible for a portion of this increase since the war began; but the statistics show a very heavy consumption of opium previous to the war, the imports for the year ending June 30, 1860, averaging over one hundred and twenty thousand pounds per annum. This is an enormous amount for the consumption of this country, and shows that a large number of people must use the drug habitually, in some form, for the gratification of their cravings for a stimulant. There may be less disgrace connected with its use, but the effects, mental and physical, are far more injurious than those which follow the abuse of alcoholic drinks, while the habit is much less easily cured or restrained.”—*American Druggists’ Circular*, from *Boston Med. and Surg. Journ.*, July 6, 1865.

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*Eucalyptus Resinifera.*—In the Jardin d’Acclimation, at Algiers, is a tree brought within a few years from Australia, the *Eucalyptus Resinifera*, which has attained a height of thirty feet and a diameter of six inches in two years. This remarkable tree, in its native soil—Australia—sometimes reaches the height of three hundred and forty feet, and has been found more than nineteen feet in diameter at about a yard from the ground. It often yields planks two hundred feet long, without a single defect. The wood, notwithstanding its rapid growth, is hard, and heavier than oak. It also presents beautiful colors, and is consequently well adapted for cabinet work. An astringent gum, known in commerce as *kino*, is obtained by making incisions into its bark. The eucalyptus is an evergreen; its leaves have nearly the same shape as the laurel. The development of its lateral branches are no less wonderful than its stems. They are small until the trunk attains the height of about one hundred feet, when they shoot out almost horizontally, sometimes to the length of ninety feet, giving the tree the appearance of an enormous umbrella. The seed, strange to say, is very small, and not unlike that of the tobacco plant. The flowers are white, of a most agreeable smell, and much liked by bees, which extract from them a most delicious honey. It is also remarked in Australia that the ague is almost unknown in districts where this tree is abundant.—*Medical and Surgical Reporter*, Aug. 12, 1865.

*On the absorption and assimilation of carbonic acids by plants.*—Mr. BOUSSINGAULT has recently made some experiments on the absorption and assimilation of carbonic acid by leaves exposed to sunlight. His results are thus summed up: 1. Leaves exposed to the sun in *pure* carbonic acid do not decompose this gas, or if they do, it is with excessive slowness. 2. Leaves exposed in a mixture of carbonic acid and atmospheric air rapidly decompose the former gas. Oxygen does not seem to interfere in the phenomenon. 3. Carbonic acid is rapidly decomposed by leaves when that gas is mixed with either hydrogen or nitrogen. The author has pointed out some analogies of these phenomena with the slow combustion of phosphorus under certain circumstances. Thus phosphorus placed in *pure* oxygen does not become luminous, and does not burn, or if it does, burns with excessive slowness. In a mixture of oxygen and atmospheric air, however, phosphorus burns rapidly; it also burns when placed in oxygen mixed with hydrogen, nitrogen, or carbonic acid. Phosphorus, which does not burn in pure oxygen at an ordinary pressure, becomes combustible when the gas is rarefied; and Mr. Boussingault found that, similarly, a leaf placed in rarefied pure carbonic acid decomposed the gas and evolved oxygen.—*Reader*, May 27, and *Amer. Jour. of Science and Arts*, July, 1865.

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*The Agassiz Expedition to South America.*—The expedition of Prof. Agassiz arrived safely at Rio de Janeiro on the 22d of April. The Emperor sent a boat alongside of the Colorado to take the party on shore, and in the evening had a long interview with Mr. Agassiz. The Secretary of the Treasury of Brazil gave orders to have the baggage and instruments of the party passed unopened at the Custom House, and every courtesy was extended to the members of the expedition by the officials of the Brazilian government.—*Boston Transcript*, June 9, and *Amer. Jour. of Science and Arts*, July 1865.

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*New Oleoresin.*—Recently some persons engaged in making turpentine in Plumas County, California, tapped some pine trees of a species new to them. The fluid flowed abundantly, but it had a peculiar odor, and when taken to the turpentine stills in the neighborhood, nothing could be done with it. At last it fell into the hands of a man who managed to distil a liquid, which proved to be a new discovery. Instead of the disagreeable odor of turpentine it has a fragrance like citron, and is free from all resinous matter. Ten gallons of it weigh as much as six and three-quarter gallons of pure water. It dissolves all the animal and vegetable oils, and leaves no stain of its own, nor does it affect any of the colors used in dyeing, and thus it is an excellent substitute for benzine, without the odor which makes the latter substance so offensive. It is also much cheaper than benzine. The new liquid is called "erasine," because of its value for cleansing. It evaporates rapidly and burns well, but it is more expensive



than coal oil. This novel product of California is now in market.—*Mining and Pet. Standard*, from *Amer. Druggists' Circular*.

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*A Mountain of Salt.*—On the south side of the island of St. Domingo, there is a mountain of salt six miles long, from one-half to a mile wide, and from four to five hundred feet high. In some places where the sides of the mountain are nearly perpendicular, large cliffs of salt are exposed to view, while in other parts a coating of earth, from ten to thirty feet deep, covers the salt. This salt, in its crude state, contains 96.79 per cent. pure salt, while the purest found elsewhere is but 96.75. By the skill and energy of Dr. Hatch, of Massachusetts, grants have been obtained from the Spanish government, and the way is being opened for bringing this immense treasure to the markets of the world. A railroad, some twenty miles in length, is to be constructed, which will bring the salt to the little port of Barahona.—*Amer. Druggists' Circular*.

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*Extracting the Juice from Grapes.*—We learn from the *Chemical News* that a M. Richter, of Stuttgart, has devised a novel means of extracting the juice from grapes. Instead of pressing them in the ordinary way, he puts them in a drum provided with a suitable strainer, and rotating at the rate of 1000 or 1500 times a minute. The process is said to have the following advantages over the ordinary method:—The time required for the operation is greatly lessened, the whole of the must from one cwt. of grapes being obtained in five minutes; the quantity of juice is increased by five or six per cent.; “stalking” is rendered unnecessary; and the agitated must is so mixed with air that fermentation begins comparatively soon.—*London Mechanics' Magazine*, from *Franklin Institute Journal*, Jan., 1865.

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## NOTICE.

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### American Pharmaceutical Association.

The Thirteenth Annual Meeting of the American Pharmaceutical Association will be held in Boston, Mass, on Tuesday, Sept. 5, at 3 o'clock, P. M.

The objects of the Association are fully explained in Article 1st of the Constitution, and the conditions of membership in Article 2d.

It is hoped that the reports of the various Standing Committees will be ready for presentation at the first sitting; and all members who have accepted subjects for investigation are earnestly requested to have their papers ready, and, should they be unable to attend, to forward them to the President of the Association, care of S. M. Colcord, Boston.

W. J. M. GORDON, *President*.

*Cincinnati*, June 21, 1865.



## Editorial Department.

MEETING OF THE ASSOCIATION.—Before some of our readers receive this number, the American Pharmaceutical Association will have convened in Boston, on the 5th of September. We hope, however, that very many will receive it in time to accept the following invitation of our confreres of the Massachusetts College of Pharmacy:

BOSTON, August 10, 1865.

DEAR SIR,—The thirteenth annual meeting of the American Pharmaceutical Association will be held in this city, on Tuesday, September 5th, commencing at 3 o'clock, P. M., at the rooms of the Massachusetts College of Pharmacy, No. 12 Temple Place.

A cordial invitation from the Massachusetts College of Pharmacy is hereby given to all members of the Association, and others of the profession, to visit Boston at that time; and it is hoped that the sessions of the Association will be a profit and pleasure to all who can avail themselves of the opportunity.

In accordance with the custom of former years, we wish that members, as much as possible, should put up at the same hotel, and, for this purpose, have made arrangements with the Tremont House, as being desirable.

Persons wishing to become members can address the undersigned, and their application will be attended to.

Essays and volunteer papers on subjects of interest may be sent to the undersigned. Specimens of materia medica, chemical and pharmaceutical preparations, plants, apparatus, &c., are solicited for exhibition, and may be sent to the care of Messrs. Smith & Melvin, 325 Washington St.

It is hoped that there will be a good representation from the Pharmacutists of New England, to welcome their brethren from other States.

Yours truly,

HENRY W. LINCOLN,  
For the Committee.

THE DUBLIN INTERNATIONAL EXHIBITION is now open to visitors, and the Journals have for some time past contained reports on the articles exhibited relating to Pharmacy. Those wishing to learn to what extent our art has been represented, will find a detailed notice commencing in the Pharmaceutical Journal for August, by Harry Napier Draper, of Dublin.

### MARYLAND COLLEGE OF PHARMACY.

Baltimore, August 7, 1865.

ED. AMER. JOURN. PHARM.:

Dear Sir,—At a meeting of the Maryland College of Pharmacy, on 3d inst., the following members were elected delegates to the Thirteenth Annual Meeting of the American Pharmaceutical Association.

*Delegates.*—J. J. Thomsen, J. Brown Baxley, John F. Hancock, W. Wesley Cunningham, J. Faris Moore.

*Alternates.*—N. Hynson Jennings, A. P. Sharp, Wm. H. Brown, Joseph Roberts, J. J. Smith.

Yours, respectfully,

GEO. W. ANDREWS, *President.*

NEW LECTURESHIPS IN THE UNIVERSITY OF PENNSYLVANIA.—The following statement in reference to this liberal act of Dr. Wood is taken from the Medical and Surgical Reporter of July 8, 1865 :—

"Publicity having been given to the proposed endowment of Lectureships in the Medical Department of the University of Pennsylvania, we will state the facts as briefly as possible, so far as they have transpired.

"The Trustees of the University of Pennsylvania, through the liberality of the distinguished Emeritus Professor of the Theory and Practice of Medicine in that institution, Dr. George B. Wood, as we are informed, have devoted the sum of \$50,000 to the endowment of lectureships in the University on the following subjects :—1. Zoology and Comparative Anatomy; 2. Botany; 3. Mineralogy and Geology; 4. Hygiene; 5. Medical Jurisprudence, including Toxicology. We have heard the names of competent gentlemen mentioned in connection with each of the chairs, but do not as yet feel authorized to give publicity to them. The appointments will be made in November next, and the first course of lectures will be given the ensuing spring. Each lecturer is to receive a salary of \$500 from the fund, and also all fees that may accrue from the sale of tickets, the fee not to exceed \$10, and regular matriculants and alumni to be admitted free.

"This liberal action of Dr. Wood is entirely in keeping with his well-known views on the subject of medical progress. He has always been a friend of thorough education, and when a teacher and professor, always insisted on a close application to his studies on the part of the student, and a proper qualification for the discharge of the responsible duties of the physician on the part of the graduate.

"In no better way could he have shown his love of, and confidence in, the science of medicine, and his attachment to his Alma Mater, the venerable University of Pennsylvania, than in the establishment of these lectureships. The devotion of a well-earned fortune to so high, honorable and ennobling a purpose as the advancement of medical education, would serve to immortalize the name of this distinguished friend of medical progress, even if he had done nothing more to secure to him so eminent a position."

As regular matriculants are to be admitted free, it will follow that the tickets sold by the Professors will be to other than students of medicine; hence an opportunity will be offered to apothecaries and others to gain a knowledge of botany, mineralogy and geology,—departments of science which should be included in a scheme of pharmaceutical education, but which our College has not yet included in its curriculum. It is of great importance that these chairs should embrace the best talent that can be obtained, as much of the influence of this act of munificence in building up a reputation outside of the Medical School of the University will depend on the ability of the new teachers. We hope the teaching of the three first chairs will be conducted on a thoroughly scientific basis, and not narrowed down to suit the present wants of the medical student. We presume the lectures will be open to the classes of the collegiate department of the University.

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JEFFERSON MEDICAL COLLEGE.—Dr. John B. Biddle, of Philadelphia, has been elected to the Chair of Materia Medica and Therapeutics in this Institution, rendered vacant by the death of Dr. Thomas D. Mitchell. Dr. Biddle is already favorably known as a teacher of Materia Medica.

REORGANIZATION OF THE MEDICAL STAFF OF THE U. S. ARMY.—Under this head, in the Army and Navy Journal of August 5, 1865, a writer, signing himself "M," criticises a previous correspondent "H," of that Journal. The following extract, relative to the Pharmaceutical Department of the Service, is deemed of interest to our readers. The writer is unknown to us.

"H." further recommends that "the fourth oldest Medical Officer on the list be made Purveyor-General, and the best Medical Storekeeper or the Medical Officer of the Regular or Volunteer Corps who shall pass the best examination in pharmacy, etc., be made Deputy Purveyor-General: these officers to be charged under the Surgeon-General with providing supplies for the Army, etc."

Now, in my opinion, this branch of the Medical Department, that of supplying the Army with medicines, needs more reform than any other; but in order to submit a plan which, it seems to me, would remedy most evils, I have to take up another point of "H.'s article. He says "the rank of the Hospital Steward should be raised to that of Cadet, etc."

What does hospital steward mean? In our Army it means a man who is, according to the law (General Order, No. 2, War Department, Adjutant-General's Office, Feb. 24, 1859), "sufficiently intelligent and skilled in pharmacy for the proper discharge of the responsible duties likely to be devolved upon him," or, in other words, he should be able to read and write, and put up a prescription. He also has charge of all the public property in the hospital, of the policing, of the providing of the sick with meals, he has to keep the hospital records and accounts, must be able to perform the minor surgical operations, and, in cases of emergency, or in the absence of the Surgeon, he is called upon to prescribe for the sick. Thus the hospital stewards in most armies are divided among three men, viz.: the apothecary, the chirurgus, and the steward proper. To call an apothecary or a chirurgus steward is simply ridiculous, especially in a country where every negro waiter in a restaurant desires to be addressed as steward.

"H." says the steward should be subjected to a most "rigorous examination"—examination on what subjects, I ask—*materia medica*, chemistry, botany, etc.? Or shall he be examined on Powers' Minor Surgery? No. Dr. J. J. Woodward's excellent book, entitled Hospital Stewards' Manual, and made authoritative by order of the then Surgeon-General, (Dr. Hammond,) who ordered a liberal supply of the same to be purchased and sent to all the Armies—is the work which tells all the steward is obliged to know and to do.

"The hospital steward," "H." says, "should be allowed and induced after two years' service to enter the list of Junior Assistant-Surgeons." Now, I ask "H." how he proposes to make out of the nondescript, a hospital steward of this day, in two years' time, a physician?

What is needed to supply the want of the Medical Department of the Army in this respect is a corps of thoroughly educated apothecaries—not drug-clerks, whose whole knowledge consists in knowing how to "make a bundle." A thoroughly educated apothecary will know how to keep accounts, and experience will teach him how a hospital should be conducted. Constitute them as a separate corps under an Apothecary-General instead of Purveyor-General, with two Deputy Apothecary-Generals. The Apothecary-General with the two Deputy Apothecary-Generals to be charged under the Surgeon-General with providing supplies for the Army,—the Apothecary-General and one Deputy Apothecary-General to be stationed in New York city,—the other Deputy Apothecary-General to



be stationed in San Francisco, Cal. Then appoint five Apothecaries with the rank and pay of Majors of Cavalry, to be stationed at the headquarters of each military division, to take the place of the Medical Purveyors. Twenty Apothecaries, with the rank of Captain of Cavalry, to be stationed as Medical Purveyors, at the headquarters of each Military Department, and two to be on duty in the office of the Apothecary-General. Twenty Assistant Apothecaries, with the rank of First Lieutenant of Cavalry, to be in charge under direction of the Surgeons of the large hospitals; and one hundred Assistant Apothecaries, with the rank of a Second Lieutenant of Cavalry, to be in charge of small garrison hospitals, and seventy-five Assistant-Apothecaries, with the rank of a Cadet, to be stationed as Assistants in large hospitals.

A Board should meet, composed of such men as Dr. Squibb, to examine applicants for the Corps of Apothecaries, and appointments should be made according to the order of merit in which the candidates have passed. Afterwards promotions should be made by seniority, always subjecting the member next on the list for promotion to another thorough examination until he reaches the grade of Apothecary, with the rank of Major.

All new applicants should enter as Assistant Apothecaries with the rank of a Cadet. They should serve at least six months before they can be admitted to another examination and promoted. In every grade above that of Cadet they should be required to serve at least five years before they can again be examined and promoted.

The total number of commissioned officers of the corps of Apothecaries would be 148, thus: One Apothecary-General with the rank of Colonel of Cavalry, two Deputy Apothecary-Generals with the rank of Lieutenant-Colonel of Cavalry, five Apothecaries with the rank of Major of Cavalry, twenty Apothecaries with the rank of Captain of Cavalry, twenty Assistant Apothecaries with the rank of First Lieutenant of Cavalry, one hundred Assistant Apothecaries with the rank of Second Lieutenant of Cavalry, and seventy-five Warrant Officers or Cadets.

This corps would prove less expensive than the present system of assigning Medical Officers as Purveyors, who are often very much dependent on their clerks in the discharge of their duties, living, naturally enough, ignorant of the drug business.

It is a wrong impression most physicians have that a physician must *eo ipso* be an apothecary, and that all an apothecary needs to know is how to put up a prescription. Pharmacy is as much of a science and requires as much study and industry as medicine. The practice of medicine depends in no small measure on the advancements in pharmacy for its success, and pharmacy, again, looks to chemistry for new developments.

The establishment of a Government Laboratory would be an excellent school for the apothecaries. Two establishments of this kind have been in operation during the last two years and a half of the war, and most of the medicines used have been prepared there at a great saving to the Government. One, situated at Astoria, L. I., was partly destroyed by fire in February last, but up to the present time is still in operation. The other is located in Philadelphia.

Almost every Government shop has been noticed in some paper or other, but the Laboratories have never received any attention—may be because they owe their origin to the Ex-Surgeon-General, W. A. Hammond, and were, perhaps, for this same reason never recognized by the Secretary of War; but whatever may be said about the administration of Dr. Hammond, the establishment of a Government Laboratory was certainly a move in the right direction.

M.



**THE SCHOOLS OF PHARMACY.**—The approaching season for study offers unusual opportunity for students. Besides the Philadelphia, New York and Baltimore schools, St. Louis commences its first regular session. We do not know whether Chicago is to be of the number or not. Our readers are referred to the Advertisement Sheet for information in regard to the Philadelphia and New York Schools. The prospect is fair for a full attendance.

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#### OBITUARY.

**WILLIAM FREEMAN DANIELL**, M. D., F. L. S., died at Southampton, (England,) on the 26th of June, after a long and painful illness. We learn from the Pharmaceutical Journal that Dr. Daniell was born at Liverpool, in the year 1818; hence his age was 47 years. He became a member of the College of Surgeons in 1841, and soon afterwards entered the medical department of the British army, serving the whole of his Assistant-Surgeonship on the pestilential coast of Western Africa. It was during this period that he made the numerous observations which have appeared from time to time in that Journal under his signature. In 1853 he became a Staff Surgeon, and was elected an honorary member of the Pharmaceutical Society. He afterwards served in the West Indies and in China. His health became very much impaired by residence in Jamaica, causing his return to England to die. He was buried at Kensal Green, on July 3, 1865. Of the numerous papers of Dr. Daniell printed in the Pharmaceutical Journal a number are scattered through this Journal; and he should be held in remembrance as a most useful observer in matters pertaining to pharmacology and botany,—a worthy example to our own naval surgeons, who often have rare opportunities to extend our knowledge of the sources of drugs, did they interest themselves in the subject.

**M. GUILLIERMOND, SR.**, of Lyons, one of the oldest of the French pharmacutists, died in his laboratory at the advanced age of 90 years, having been born in December, 1776, at Pont-Saint-Esprit. He was in a military hospital in 1793, and in 1806 opened a store in Lyons, which he occupied for sixty years. During this long career M. Guilliermond contributed numerous papers to the *Journal de Pharmacie*, the most important of which refer to Peruvian Bark, Opium, and their alkaloids, and the process of displacement. He was a correspondent of the Society of Pharmacie at Paris, and the President of the Society at Lyons.

**PYRAME-LOUIS MORIN**, Pharmacien Chemist, died at Geneva, December 1, 1864, aged 50 years. His immediate ancestors for two generations were men of science, and his own education as a chemist under Lowig, of Zurich, and Mitscherlich, of Berlin, followed by his practical studies under Soubeiran, at the Paris Central Pharmacy of the Hospitals, rendered him one of the ablest members of our profession in Geneva.

THE  
AMERICAN JOURNAL OF PHARMACY.

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NOVEMBER, 1865.  
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MINUTES OF THE THIRTEENTH ANNUAL MEETING OF  
THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1865.

The thirteenth annual meeting of the American Pharmaceutical Association commenced its proceedings at the hall of the Massachusetts College of Pharmacy, Temple Place, Boston, on Tuesday, September 5th, 1865, at 3 o'clock, P. M., the President, W. J. M. Gordon, of Cincinnati, occupying the chair; Henry N. Rittenhouse, Secretary.

A Committee on Credentials was appointed by the chair, consisting of Messrs. Stearns of Detroit, Moore of Baltimore, and Massot of St. Louis, and pending their action the President invited all members present to enroll their names in the roll book belonging to the Association.

The Committee on Credentials reported the following gentlemen as delegates to attend this meeting, viz. :

*From the New York College of Pharmacy.*—George C. Close, William B. Little, C. W. Kitchen, P. W. Bedford, F. F. Mayer.

*From the Cincinnati College of Pharmacy.*—E. S. Wayne, A. M. Johnson, L. Groneweg, Paul Reinlein, W. J. M. Gordon.

*From the St. Louis College of Pharmacy.*—Theodore Kalb, Ferd. F. Sennewald, Hubert Primm, E. L. Massot, J. S. B. Alleyne.

*From the Maryland College of Pharmacy.*—J. J. Thomsen, J. B. Baxley, N. H. Jennings, J. Faris Moore, W. W. Cunningham.

*From the Philadelphia College of Pharmacy.*—Dr. W. H. Pile, Edward Parrish, J. M. Maisch, Evan T. Ellis, D. S. Jones.

*Massachusetts College of Pharmacy.*—Charles A. Tufts, John Buck, William Brown, G. F. H. Markoe, S. M. Colcord.

*Alumni Association of the Philadelphia College of Pharmacy.*—Thomas S. Weigand, Ferris Bringhurst, R. M. Shoemaker, Charles L. Eberle, A. E. Ebert.

A question being raised as to the eligibility of the latter Association to send delegates to this body, it was freely discussed, and decided negatively by the President.

Mr. Colcord appealed from the decision of the chair, and being sustained by the meeting, after further discussion the delegates were admitted.

(The objections appeared to rest on the fact that the Alumni Association was not a regular Local Pharmaceutical Organization, its members residing in various parts of the Union. It was shown, in opposition to this view, that the Massachusetts College represented all the New England States, and that the first member on their Delegation was from New Hampshire. It was also shown that the objects of the Alumni Association were in harmony with the objects of this Association.)

The Chairman of the Executive Committee, Mr. Maisch, reported the following named gentlemen as applicants for membership coming duly recommended, viz.:

Fred. W. Coleman, Walla Walla, Wash. Ter.	Robert Platzter, Phila., Pa.
Bunting Hankins, Bordentown, N. J.	W. H. Muller, Chicago, Ill.
Robert B. Parkinson, Phila., Pa.	G. M. Hambright, "
Henry Sweet, Chicago, Ill.	Joseph Willard, "
F. A. Bryan, "	James Boland, "
J. P. Sharp, "	N. Mead, "
J. H. Hooper, "	Henry Biroth, "
Louis Woltersdorf, "	Charles Heylman, "
Thomas Whitfield, "	Emil Dreier, "
Henry G. D'Evers, "	M. P. White, "
John Parsons, "	J. V. Z. Blaney, M.D. "
Emil Dietzsch, "	J. Henry C. Simes, Phila., Pa.
Thomas Brown, "	Edwin Scott, Chattanooga, Tenn.
N. T. Curth, "	James R. Mercein, Jersey City, N. J.
A. B. Bryan, "	J. M. Abernethy, "
S. S. Bliss, "	Thomas Tanton, St. Louis, Mo.
Henry W. Fuller, "	Evermont Randals, "
George McPherson, "	Ferd. W. Sennewald, "
John Burrell, Freeport, Ill.	Daniel Roemer, Cincinnati, O.
A. Palmer, Janesville, Wis.	Alfred V. Forgey, "
Edwin Tomlinson, Fort Wayne, Ind.	Jerome B. Jardella, Madison, Ind.
Charles E. Hænchen, Boston, Mass.	John Frey, New York, N. Y.
Augustus Henkel, Phila., Pa.	C. F. L. Hohenthal, "
	Hervey D. Thatcher, Potsdam, N. Y.

Gustavus Krehbiel, New York, N.Y.	C. G. Underwood, Boston, Mass.
James F. Morgan, "	J. B. Colton, "
F. W. Colby, "	W. D. Atkinson, "
Robert C. Kennedy, Cleveland, O.	L. R. Blackman, Jackson, Mich.
Henry E. Webb, New York, N. Y.	Leonce Cherot, Memphis, Tenn.
Max Frohwein, "	G. W. Churchill, Chelsea, Mass.
C. W. Kitchen, "	Eugene Whittemore, Boston, Mass.
Alfred Mason, "	Charles F. Bartlett, "
T. Gibson Tweed, "	Wm. D. Broomhead, East Somerville, Mass.
Wm. E. Jenkins, S. Boston, Mass.	J. Sanborn, Jr., Dorchester, Mass.
James Gallagher, Terre Haute, Ind.	F. W. Hoyt, Lowell, "
William H. French, Lowell, Mass.	E. H. Perry, Boston, "
Geo. W. Austin, Terre Haute, Ind.	G. D. Dows, " "
D. G. Wilkins, Boston, Mass.	George Marsh, Dedham, "
J. Howes Dyer, "	E. H. Doolittle, Jr., " "
Chas. M. Duren, St. Albans, Vt.	S. A. D. Shepard, Salem, "
Henry C. Steever, Memphis, Tenn.	James F. Babcock, Boston, "
Andrew Blair, Phila., Pa.	John R. Colby, " "
G. W. Eldridge, "	E. R. Knight, Melrose, "
J. L. Bispham, "	M. L. Wetherell, Gloucester, "
J. R. Nichols, Boston, Mass.	Andrew Geyer, Ipswich, "
Bruce M. Brake, Cincinnati, Ohio.	Frank B. Clock, Manchester, N. H.
G. W. Brown, Logansport, Ind.	F. E. Covell, Portland, Maine.
H. Van Sweringen, Ft. Wayne, Ind.	W. Augustus Safford, Boston, Mass.
Eben Blatchford, Jr., Rockport, Mass.	F. W. Simmons, " "

A ballot being ordered, two members were appointed tellers, who reported the unanimous election of the candidates.

The roll being now called the members present answered to their names.

The reports of Standing Committees being called for, the report of the Executive Committee was presented by its chairman, Mr. Maisch, and laid on the table.

The Report of the Committee on the Drug Market being next in order was called for, but not ready.

The Report of the Committee on a certificate of membership was ready.

The Committee on the Pharmacopœia had nothing to report.

The Committee on Scientific Queries was ready.

It was now ordered that the Report of the Executive Committee be read, which was done by the chairman, as follows :



"The Executive Committee submit the following Report of their labors during the last year.

At the meeting in Cincinnati, a resolution was passed, but afterwards reconsidered and lost, to withhold the Proceedings from all members who are three years in arrears with their annual contributions.

The rise in the price of paper and labor made it obvious that the cost of publishing the Proceedings would be considerably higher than heretofore, and in view of the depleted state of our treasury it was suggested, and agreed to by the Treasurer, to send out the bills for the year 1865 in the early part instead of in the middle of the year, in order to avoid, if possible, the necessity of borrowing money to meet the current expenses, as had to be done on former occasions. A glance over the Treasurer's books revealed the alarming fact that the amount due to the Association by delinquent members, who were in January last in arrears with their contributions for *four* years and over, amounted to nearly three thousand dollars!

The Chairman addressed a circular to the members of the Executive Committee and suggested, in view of the reconsidered resolution before mentioned, to withhold the Proceedings from all members *four years in arrears*, which was unanimously agreed to.

It having been ascertained that the Association was not in possession of the signatures of many of the members, to the Constitution, and it being impossible to ascertain whether these signatures had ever been given and subsequently lost, or not, it was likewise agreed to require from all such members their signature to the Constitution, and in the event of their refusal or neglect to comply with this request to withhold the Proceedings from them likewise.

In the meantime a circular had been addressed to all the newly elected members requesting them to sign the Constitution and pay the dues in accordance with Art. ii. 3 and 4. The same circular was also sent to all those members whose signatures were not in possession of the Executive Committee.

The answers to these communications were extremely few, and after waiting for several weeks another circular was sent, with a copy of that portion of the preface to the Proceedings for 1864 referring to their case.

The cases of delinquent members were treated precisely the same way, two circulars being sent at different times to each one four years in arrears who did not respond to the first.

All neglects and refusals to comply with the requests of the Executive Committee shared alike; the Proceedings for the last year were withheld from such members.

At the approach of the present meeting, early in August, the Chairman issued another circular chiefly with the view of informing all concerned that their cases would be laid before the Association for its action.

In the larger cities one of the members of the Association was requested

by the Chairman to endeavor to collect the signatures and dues of the members in question, and we hereby express our gratitude to the following gentlemen for their prompt aid extended to us: Messrs. S. M. Colcord of Boston, P. W. Bedford of New York, J. B. Baxley and Prof. Moore of Baltimore, Eugene L. Massot of St. Louis, E. H. Sargent of Chicago, Frederick Stearns of Detroit, W. J. M. Gordon of Cincinnati, J. C. Mattern of Pittsburg.

Appended to this report we hand in a list of those members who have never answered the request of the Executive Committee to sign the Constitution, and those who refuse to sign it mostly for the reason that they never intended to become members. We also append a list of those members to whom circulars were sent for being in arrears and who have never paid up their dues.

It should be remarked here that no communication was held or attempted with members of the above mentioned classes who reside in States lately in rebellion against the United States. A list is appended of those of whom the Executive Committee could find no evidence of their having signed the Constitution.

The correspondence in relation to the above subjects was carried on during the publication of the Proceedings of 1864. The chief causes for the delay in issuing the volume, were beyond the control of the Executive Committee. Notwithstanding an unlooked for delay in the transmission of the minutes and manuscript papers, and the sending of proofs to distant cities, hopes were entertained to deliver the Proceedings to the members early in January; the subsequent delay was due to the slow execution of the principal plates.

An edition of one thousand copies was printed, 750 bound in cloth and 250 in paper covers. The cost of publishing the same was as follows:

For Composition,	\$459 21
Press work,	55 20
Paper, (27 reams at 13 dollars),	351 00
Lithographing, wood cuts, and printing,	98 00
Binding 750 volumes in muslin (25 cts.,)	187 50
Paper covers and binding,	9 50
Wrapping 650 volumes,	5 50
Internal revenue tax,	57 60
Total cost of publication,	\$1223 51

The other expenses of the committee were:

For Postage and revenue stamps,	\$44 60
Postal money orders,	40
Stationary and Blank books,	5 61
Delivery of Proceedings in Philadelphia,	2 00
Packing boxes and freight,	27 20
Printing 500 Constitutions,	9 71

Printing circulars, . . . . .	15 75
Finishing 16 vols. Proceedings 1863, . . . . .	6 50
Freight for Exchange Journals, . . . . .	50
Binding manuscript, . . . . .	1 50
Fire Insurance, . . . . .	13 30
	<hr/>
	\$127 07

Total expenses of the Committee during the year, \$1350 58

One copy, bound, was delivered by mail, post paid, to each member entitled, except those residing in the larger cities, who were supplied by a member resident there. No one was omitted, but several volumes failed to reach their destination and had to be remailed. [The Committee complain of the omission of members to inform of their change of residence which is a fruitful cause of these miscarriages, and suggest that such persons should not be re-supplied without charge.]

The stock of Proceedings of the different years stored at the hall of the Philadelphia College of Pharmacy is as follows:

For 1852, . . . . .	None.
" 1853, . . . . .	225 copies.
" 1854, . . . . .	43 "
" 1855, . . . . .	Nope,
" 1856, . . . . .	42 "
" 1857, . . . . .	293 "
" 1858, . . . . .	366 "
" 1859, . . . . .	83 "
" 1860, . . . . .	169 "
" 1862, . . . . .	350 "
" 1863, . . . . .	280 "
" 1864, . . . . .	364 "

This list does not include several volumes at each of the points of distribution in large cities.

The stock was insured by the Executive Committee in the New Amsterdam Fire Insurance Company of New York City, for nineteen hundred dollars at a premium of seven-tenths per cent., making an annual expense of \$13.30. The Committee recommended that the amount of insurance be increased or decreased annually, by the Chairman of the Executive Committee, if the value of the property should change materially.

Comparatively little revenue was derived from the sale of Proceedings; as far as ascertained the amount is as follows:—15 copies for 1864 and 18 of previous years \$40.09.

The Committee recommended to deposit with the Colleges of Pharmacy of the United States that are willing to undertake the trouble, a small number of copies of the different years, provided that the Secretaries of these Institutions agree to furnish a complete statement of sales and stock remaining unsold, by the 1st of August of each year, to the Chairman of the Executive Committee.

They also recommended that members write their papers on foolscap paper to enable the Secretary to file them away in accordance with Art. 3d Section 4 of the Constitution.

[The Report proposes several alterations in the Constitution in relation to the admission of members; to the annual payment; to the withdrawal of members; and to the duties of the Executive Committee, but space does not allow of their notice here.]

We deem it expedient to say a few words with regard to the financial prospects of the Association. The heavy expenses for publishing the last Proceedings could only be met by the prompt payment of the annual contributions of the current year, and of the debts of some members incurred in past years. It is more than probable that very little revenue will be derived hereafter from this latter source, nearly all who allowed their bills to accumulate for four years or more, and who feel any interest in the cause of Pharmacy having paid up. Each year a number of members by becoming life members become exempt from dues, and if hereafter we allow no one to leave his dues unpaid for more than two years, we can henceforth calculate only on the new acquisitions to our number. If we admit the annual expenses to be \$1200, it will require an average addition of 48 members annually, which the committee think within the limits of probability. No further taxing of life members will be necessary if we only carry out our laws. But in case any unforeseen emergency should arise, a clause might perhaps be added to the Constitution, enabling an extra tax to be levied on all members alike at any annual meeting, such tax to be paid by the 1st of January following. We have no doubt that an additional assessment would be willingly paid by each member, if the Association would express the necessity for it.

Gradually as the blessings of peace continue, our expenses will be again less, and the time may come when we shall be enabled to offer prizes for original investigations if deemed proper.

Before closing the report, the sad duty remains to be performed of announcing the names of those of our associates whom death has removed from amongst us as far as we have heard.

G. C. Wilson, of Boston, Mass.	Frederick Rollman, Phila., Pa.
Wm. Gay, Cambridgeport, "	N. Cressman, Waterloo, C. W.
D. F. White, Charlestown, "	Lewellyn Phillips, Baltimore, Md.
W. F. Clency, Cincinnati, Ohio.	William Longshaw, Jr., Bayou Sara,
Frederick L. John, Phila., Pa.	La.

[We have not space for the obituary notices, and omit them.]

The report was on motion accepted.

A Committee on Nominations was now appointed, according to Constitutional provision, by the delegations and the President, —viz.:

George C. Close, of New York, E. L. Massot, of St. Louis,



E. Parrish, of Philadelphia, J. F. Moore, of Baltimore, W. J. M. Gordon, of Cincinnati, S. M. Colcord, of Boston, T. S. Wiegand, of Philadelphia, by the delegations. Frederick Stearns, of Detroit, Charles A. Tufts and E. W. Sackrider, by the President.

The President now read his annual address.

*To the Members of the American Pharmaceutical Association :*

GENTLEMEN,—We feel highly privileged in meeting again in this beautiful city, the centre of learning and refinement, where we have always been welcome'd with so much cordiality and genuine hospitality. We rejoice to meet within her classic and historic walls, feeling that when we return to our distant homes, we shall feel that it was good for us that we had been there.

We meet this year under circumstances of no ordinary importance and significance, both as regards the time and the place.

Since our last assembling, in the Queen City of the West, the direful sounds of desolating war have ceased; the honor of the flag of our country has been vindicated; peace and union once more reign throughout the length and breadth of our land.

You will not consider me an enthusiast when I say that we ought to bless and praise our God with all our hearts, for His great mercies to us as a nation; we ought to show forth our gratitude for His goodness to us, with the best power we possess. Allow me to congratulate you upon this most auspicious event, of such vast moment not only to our country, but also to our honored Association. May the gates of the temple of Janus, which have been open during the last four eventful years in the history of our country, and are now to mark the return of peace, remain closed forever. May the God of nations so rule the destinies of our great and glorious republic, that our citizens may never again be summoned from the walks of peace and usefulness to learn the art of war, and pour forth in seas of blood their precious lives,—thus carrying desolation and bereavement to the hearts and hearths of their once happy homes.

As members of a scientific Association, having for its main object the advancement of the members of our calling, in elevating and useful knowledge, we have, as a matter of course, nothing whatever to do with politics; our boast is that we meet on the common ground of a brotherhood which interferes not with the religion or politics of any of its members. We feel, therefore, that we have nothing to do as a Convention, assembled for such purposes as I have indicated, with the war, (which is now happily closed,) other than to deplore its necessity, to mourn over the separation it has caused us, for the time being, from many of our brethren; to regret the hindrance it has been to the advancement of our cause, and to rejoice (which we do most heartily) in its termination. Many of our members, particularly in the Southern States, have been

practically cut off from connection with our Association during the last four years, and their vacant places have been the cause of no little sorrow to those of us who were enabled to meet. I think I express the sentiments of every member of the Association now met in our annual conclave, when I say our doors stand open to all those who have been hindered from meeting with us, and a hearty welcome awaits them. A mere conforming to the rules in the matter of dues in arrears, is all that will be required to entitle them to this privilege, as well as to the Proceedings of our annual meetings that would be due them. The moral effect of such a reunion as we contemplate, and trust most heartily will be consummated upon the nation at large, cannot easily be over-estimated. It will be one link, at least, in that chain of restored confidence and friendly intercourse which every true patriot and lover of his country must be anxious to witness, and is willing to do all in his power to accomplish.

The financial condition of the Association is extremely gratifying ; it is entirely free from debt, and has about \$350 remaining in the treasury. This is much better than anticipated at our last meeting. The cost of publishing the Proceedings of the last Convention was about one-third more than the year previous.

The Executive Committee will make a comprehensive report of their labors since our last meeting, and also several suggestions as amendments to the Constitution, which they think desirable.

Attention is called to the large amount due by members in arrears. The amount now due by all delinquents is \$3,458, the principal portion of which is from those who are in arrears over four years.

This subject has been under consideration before, but without arriving at a conclusion as to the best means of overcoming the difficulty and preventing further losses. It has been placed before most of those in arrears, at least as far as it could be done, and the success attending it will no doubt be reported to you. There are a large number who have been elected members, and whose names appear upon the roll, that have not signed the Constitution, and some have not paid a single contribution. Printed copies of the Constitution have been placed before them all, that their membership might be perfected.

I think the time has arrived when prompt action should be taken in regard to delinquents, as due notice has been given, and no benefit can arise from further delay, such being useless to the Association,—neither contributing means or their presence to its support.

I would suggest that the names of those in arrears over four years be removed from the roll, and placed upon a suspended list in the published Proceedings for one year, with the privilege of reinstatement at the expiration of that time, if the Constitution is signed and dues paid up. If not, their membership to cease.

The Committee on the Progress of Pharmacy present a less voluminous report than usual, caused by circumstances beyond the control of the

Chairman. Any falling off in this most interesting part of our proceedings is much to be regretted, and it is hoped may yet be made perfect in time for publication.

I have not been able to confer with the Committee on the Drug Market, nor the Committee on the Pharmacopœia.

The Committee on Scientific Queries will present an ample number for investigation; and I take this occasion to urge upon all who accept subjects the importance of investigation, and a report at the appointed time. Frequently the Association is deprived of information that would be obtained from others, by subjects being taken and never reported on.

The large tax upon spirit is one of the most important matters for our consideration. Its bearing upon the drug trade, and the manufacture of chemical and pharmaceutical preparations so largely increasing their value, making a class of articles evidently never intended to be so much enhanced in value from this cause by the framers of the internal revenue law, but no doubt was either overlooked, or the extent to which it enters into medicinal preparations not known to them. While none of us would interpose an objection to whatever tax the government may see fit to put upon spirit as a beverage, we think it should be exempt from taxation for chemical and pharmaceutical uses; and I have no doubt if this subject was brought properly before the Committee of the next session of Congress, the relief desired could be obtained.

There are obvious reasons why medicines should be produced as cheaply as possible. The large consumption of them by those illy able to bear the expense, who at the time are unable to labor, and who are dependent upon it for their support, while cheapness of the means of producing will offer less temptation to deception, and insure them of better quality.

The Internal Revenue Law, in the construction placed upon it for licenses and manufacturers' tax, is another heavy burden upon the pharmacist, and, as far as my knowledge extends, not borne in proportion by any other branch of business. From three to four licenses are required to conduct the practice of pharmacy: 1st, a license as retail dealer in medicines; 2d, to retail liquors, which are officinal medicinal articles; 3d, to sell liquors in quantities over three gallons; 4th, a manufacturer's tax, if the articles made exceed six hundred dollars per annum; and six per cent. to be paid upon the articles manufactured.

A dealer in almost any other business can take out a single license, which will cover a wholesale and retail business. These, and the tax upon alcohol, should receive our earnest consideration, and an endeavor to obtain some relief.

Some interest, as well as apprehension, has been manifested in regard to the large number of Hospital Stewards who have been relieved from the army, and what the bearing may be upon the status of Pharmacy. I can scarcely conceive that the influence will be important. While those qualified for the practice of pharmacy will no doubt return to their call-

ing, and assume a position according to their ability, those unqualified must necessarily take position according to their merit.

At the last meeting an amendment was offered to the Constitution, and laid over to an early session at this meeting, to elect a permanent Recording Secretary, at a salary of \$100 per annum, and the payment of travelling expenses to and from the place of meeting, who shall edit the Proceedings and attend to their distribution. It will be necessary to act upon this early, so as to give a chance for election, if adopted.

At our last meeting a Committee was appointed to get up a new certificate of membership. No doubt a report will be made by them.

In closing this report, it is a source of extreme gratification to be able to say that after passing through a period of over four years of war, with its necessary excitement, and the withdrawal of so many from scientific pursuits, and the consequent loss to Associations of this kind,—that we present so prosperous a condition; and there can be no doubt but that from this time forward (as it has been in the past,) we shall go on in unexampled success and usefulness.

In retiring from the Chair, I tender to you all, whom I have met with so many years, and with so much pleasure, my earnest thanks for your partiality in placing me in the position I have occupied the past year, and the manner in which you have sustained me in the discharge of its duties.

W. J. M. GORDON, *President*.

The resolutions relative to the alteration of the Constitution, so as to make a permanent Secretaryship, with a salary attached, laid over for action from last year, and which should have been considered before the President's address, being now brought up, the President stated that it must now be acted upon before adjourning.

The Chairman of the Business Committee read the resolution concerning the amendment, and stated that the first question was, Shall the Constitution be amended?

The question was put by the Chair, Shall the Constitution be amended? which was carried.

Shall the Secretary be elected permanently? This also was carried.

Dr. Squibb.—It remains to decide whether the Permanent Secretary shall have a salary; and if so, what salary. I should like to hear a general expression of views from the members.

Mr. Maisch.—I am in favor of giving a salary, and should vote for increasing it if we were able to do so. The amount stated is insufficient.



Mr. Parrish was for leaving the amount to be fixed annually.

Mr. Tufts favored this view, as not involving an alteration in the Constitution.

Mr. Stearns wanted information to explain the objects of the amendment.

Dr. Squibb.—These are that the Association should have a fixed officer and organization, to transmit business from one year to another. It is now an annual organization, excepting the Executive Committee, and that only appears in a report. With a permanent Secretary there will be an officer who is conversant with the business, and carries it forward from meeting to meeting. He will have possession of all papers, have charge of printing and editing the Proceedings, and by education will become better adapted to do the work than any other. The Proceedings would then always be published in the same place, and a regular routine established, &c.

Mr. Maisch said the foreign correspondence with European Societies would best centre in the permanent Secretary, and he would be a constant medium for the receipt of books, papers, &c.

[Further discussion ensued, for which we have not space, resulting in fixing the salary at one hundred dollars, and directing the travelling expenses of the Secretary to be paid by the Association.]

An invitation was received from Mr. J. G. Williams, Apothecary at Massachusetts General Hospital, to visit that Institution. Also an invitation from Prof. Asa Gray to visit the botanical garden at Cambridge; both of which were accepted, and thanks tendered for the courtesy.

The meeting then adjourned until to-morrow morning at 9 o'clock.

*Second Session—Sept. 6th. Wednesday morning.*

The meeting was called to order by President Gordon, at 9½ o'clock.

The Secretary called the roll, and read the previous minutes.

The Executive Committee brought forward the following names of candidates for membership, viz.:

C. W. Lowe, Cambridgeport, Mass.	Alf. Daggett, Jr., New Haven, Conn.
Robert R. Rhodes, Brooklyn, N. Y.,	Michael J. Lauer, Baltimore, Md.
Jas. E. Blake, New Bedford, Mass.,	

An election being ordered, Messrs. Shinn and E. C. Jones, acting as tellers, reported the unanimous election of the candidates.

A communication was received from John L. Hunnewell, which was read and directed to be placed on file.

Prof. J. F. Moore, of Baltimore, read the Treasurer's Report, which was accepted and referred to an Auditing Committee, consisting of Messrs. Stearns, Moore and Haviland.

[We have not space for this report. It is sufficient to say that, through the energy of the Treasurer, his report shows the Association to be out of debt, with a balance of \$326.11; the receipts being \$1823.71, and the disbursements \$1497 60. The Treasurer declines further service, and recommends that in future the travelling expenses of this officer be paid by the Association.]

Prof. Parrish called attention to the remark in the Treasurer's report regarding the expense attending the office, and moved that the Auditing Committee should consider that subject, and report on it, to see if anything could be done. The motion was carried, and the Committee so instructed.

The Committee on the Certificate of Membership presented a report.

This Committee, consisting of A. B. Taylor, E. T. Ellis, and J. T. Shinn, reported that they had agreed upon a form of words, and the style in which to execute them. They applied to the American Bank Note Company to get an estimate of the cost of engraving on copper or steel, but the artists of the Company were all so entirely engaged as to prevent their undertaking it. Application was then made to a lithographer, who agreed to do the work, but failed to perform his promise; so the Committee concluded to exhibit their design to the Association, and get its final directions, as the Bank Note Company will now undertake it for \$150.

On motion of Dr. Squibb, the report was accepted and the present Committee continued, with the instruction to carry out the suggestion of the report by procuring a steel plate, executed in the best style, according to the general character of the design submitted.

On motion of Mr. A. B. Taylor, P. W. Bedford was added to this Committee.

The Committee on Nominations being now ready, they reported the following named gentlemen for officers, and for the several Standing Committees :

*For President,*

HENRY W. LINCOLN, . . . . Boston, Mass.

*For Vice Presidents,*

1st. GEORGE C. CLOSE, . . . . Brooklyn, N. Y.

2d. E. W. SACKRIDER, . . . . Cleveland, Ohio.

3d. C. A. HEINITSH, . . . . Lancaster, Pa.

*For Treasurer,*

CHARLES A. TUFTS, . . . . Dover, N. H.

*For Recording Secretary, (permanent,)*

JOHN M. MAISCH, . . . . Philadelphia, Pa.

*For Corresponding Secretary,*

P. W. BEDFORD, . . . . New York.

*Executive Committee,*

THOMAS S. WIEGAND, . . . . Philadelphia, Pa.

JOHN BUTTERWORTH, . . . . Boston, Mass.

W. SENNEWALD, . . . . Saint Louis, Mo.

T. H. BARR, . . . . Terre Haute, Ind.

J. M. MAISCH, (*Rec. Sec.*), ex officio, . Philadelphia, Pa.

*Committee on the Progress of Pharmacy,*

ENNO SANDER, . . . . Saint Louis, Mo.

G. F. H. MARKOE, . . . . Boston, Mass.

THEODORE KALB, . . . . St. Louis, Mo.

FERRIS BRINGHURST, . . . . Wilmington, Del.

P. W. BEDFORD. (*Corres. Sec.*), ex officio, . New York, N. Y.

*Committee on the Drug Market,*

SAMUEL M. COLCORD, . . . . Boston, Mass.

J. J. THOMSEN, . . . . Baltimore, Md.

WILLIAM A. BREWER, . . . . New York.

EZEKIEL SARGENT, . . . . Chicago, Ill.

W. J. M. GORDON, . . . . Cincinnati, Ohio.

*Committee on Scientific Queries,*

WILLIAM PROCTER, JR.,	. . . . .	Philadelphia, Pa.
EDWARD S. WAYNE,	. . . . .	Cincinnati, Ohio.
EDWARD PARRISH,	. . . . .	Philadelphia, Pa.
R. H. STABLER,	. . . . .	Alexandria, Va.

*Business Committee,*

DR. E. R. SQUIBB,	. . . . .	Brooklyn, N. Y.
F. STEARNS,	. . . . .	Detroit, Mich.
J. F. MOORE,	. . . . .	Baltimore, Md.

Mr. Maisch here remarked that he had no idea that his name would be presented in connection with the office of Secretary, after what he had said last year; and he felt the same way now. The duties are very arduous, and combine the labor of two officers, as heretofore. He would therefore suggest that some other member be nominated for permanent Secretary.

Prof. Procter and others desired Mr. Maisch to accept the nomination, and he finally consented.

The Association now proceeded to ballot for President, Evan T. Ellis and S. M. McCollin acting as tellers, who reported a unanimous vote had been given for Mr. Lincoln. The President announced this result, and appointed Messrs. Procter and Stearns to conduct the President elect to the Chair, after the election of the remaining officers.

On motion of Mr. Moore, the President was authorized to cast a ballot for the remaining officers and committees; which being in the affirmative, they were declared duly elected.

President Lincoln was now conducted to the Chair, and, amid much applause, responded in the following remarks:

*Members of the American Pharmaceutical Association:*

GENTLEMEN,—For this unexpected and undeserved token of your approbation, you will please accept my warmest thanks. I had hoped to be allowed to remain a silent listener to your interesting debates and discussions, without taking an active part; and it is with many forebodings that I accept the honor conferred. I shall try, however, so to perform the duties which shall devolve upon me, as not to interfere with the welfare of the Association. With the larger lights which have gone before me in this Chair, it should not be easy to go amiss. But I shall rely mostly on the kindness which you have shown in electing me as your presiding officer, to carry me safely through the duties of the office.



In the annual meetings of this Association, Boston has received a two-fold honor,—and the occasions are not dissimilar. The first meeting held here was the first under the Constitution and name, held at a time when the policy of the Association was not fully developed, and when discord and secession, under the garb of “good of its kind,” reared their heads and threatened the life of the young genius of Pharmacy. The question was promptly met, fully and warmly discussed, and laid away to be at rest forever. The second honor is the present, when, after a long four years’ civil war, our national government, in its contest with that monster which threatened its Constitution and life, has met the question, promptly and warmly, and fully discussed it, and laid it away,—it is to be hoped forever.

As in the first instance members of the Association who had differed from one another, and warmly discussed the question at issue, quickly acquiesced in the decision of the majority, and have ever since continued active and valuable members, so in the latter case, we hope now that the clouds are brushed away from the political horizon, we may have the aid of those who have been prevented from meeting with us for the last four years, and, under the united help of all, the Association will continue its career of prosperity, until its roll of members shall number its thousands, and the time be not far off when the distant shores of the Pacific shall welcome the Association at one of its annual meetings—

“The North and South together meet,  
And East and West their tribute bring.”

As a member of the Massachusetts College of Pharmacy, and speaking for them, I bid you a hearty welcome to these halls, where you have met once before, and to this city, at your third meeting here. We hope that your stay here will be pleasant and profitable to you, and that you will return to your homes in safety, feeling refreshed and benefitted by your scientific and social gathering.

Mr. Maisch and the other officers elect now assumed their respective duties, and, on motion of the Chairman of the Business Committee, the thanks of the Association were tendered to the retiring officers for their services to the Association.

The Business Committee recalled a former resolution of the Association, to let the reading of scientific papers proceed parallel with other business.

Prof. J. F. Moore now read the preliminary portion of his report on the progress of pharmacy, and gave a general idea of its contents, stating that a portion of the report was yet unfinished, but would be ready for the Secretary soon.

On motion the report was accepted, and referred to the Committee to complete it and give to the Secretary for publication.

A letter from Mr. C. Wiedman, the Librarian of the Royal Bavarian Academy of Sciences, of Munich, was read by the Secretary, acknowledging the receipt of our Proceedings, and requesting a complete set of the Proceedings of the Association; promising an exchange of their Proceedings in return.

The Secretary also stated that he had received, through the Smithsonian Institution, the following work, which he now laid before the Association: "Bulletins des Séances de la Classe des Sciences" of the Academie Royal de Belgique, for the year 1863.

On motion, the Secretary was directed to forward copies of the Proceedings to the above named Academies, and to the Mercantile and Astor Libraries, of New York.

A letter was read from the Secretary of the Pharmaceutical Society of St. Petersburg, Russia, regarding an International Pharmaceutical Congress:

ST. PETERSBURG, May 16, 1865, new style; (May 4, old style.)

MUCH RESPECTED SIR:

The various Pharmaceutical Associations of Europe have resolved to hold an International Congress of Pharmaceutists at Brunswick, for the purpose of effectually removing many evils existing in the field of pharmacy. (See *Pharmaceutische Zeitschrift für Russland Intelligenzblatt*, No. 1, which is enclosed.)

The great distance between America and Europe renders it perhaps impossible to see your pharmaceutical delegates at the Congress, though the appearance of deputies of American Societies could be but favorable to this international cause. Should you not be able to come or send somebody, I would request you to give me as soon as possible, at any rate previous to the meeting, some information about the condition of North American pharmacy, with particular regard to the questions of the programme. Should you not be able to correspond in the German, I would beg you to write in the English language. The letter need not be prepaid. I remain respectfully,

Your obedient servant,

DR. G. A. BJÖRKLUND,

Secretary of the Pharmaceutical Society, and Apothecary at St. Petersburg, Russia.

On motion, the Permanent Secretary was directed to answer this letter.

Mr. Taylor moved to refer the reprinting of the Minutes of the first meeting of 1851, and the Proceedings of 1852 and 1855,

to the Executive Committee, with full power to act; which was agreed to.

The report of the Committee on the Drug Market being called for, Mr. Bedford stated that Prof. Mayer had prepared a schedule of a report, but had been prevented from completing it. Dr. Squibb made some further explanations, and moved that Prof. Mayer be excused from furnishing a report.

Prof. Procter moved to amend by referring any report Prof. Mayer may have to make to the Executive Committee; but after some explanation, this amendment was withdrawn, and the original resolution of Dr. Squibb was carried.

The Report of the Committee on Queries was read by Prof. Procter. It embraced thirty-three queries. The report was accepted, and the Committee continued to procure acceptances of the proposed queries, and report at a future sitting. (See 5th session.)

The Special Committee, appointed at the last meeting (J. F. Moore and J. Brown Baxley), to ascertain who were the delinquent members, and what amounts they owed the Association, reported through Prof. Moore, of Baltimore. The Committee suggested that the names of all members, residing in such States as could be reached by the U. S. mails during the last four years, who have failed to sign the Constitution, and are over three years in arrears, be stricken from the roll. Those living in the Southern States, and who could not be reached by the mails, be granted a further indulgence.

On motion of the Business Committee, the report was accepted, and referred to a Special Committee, consisting of Messrs. Moore, Colcord, Haviland and Tufts, to report some course to be pursued.

A communication from the Apothecaries and Druggists of Detroit, extending a cordial invitation to the Association to hold its next meeting in that city, was received and read.

Eugene L. Massot, on behalf of the Pharmacutists of St. Louis, invited the Association to meet in that city.

P. W. Bedford extended a similar invitation on behalf of the Pharmacutists of New York.

These invitations were received with the thanks of the Asso-

ciation, and laid on the table, until the subject of the next place of meeting comes up for consideration.

On motion of the Chairman of the Business Committee, it was determined to proceed with the reading of the Answers to the Queries of last year.

QUERY 1st.—On *Cimicifuga*. Referred to E. C. Jones. The answer was ready, but the author not being present, it was postponed.

QUERY 2d.—Accepted by Albert E. Ebert, on *Gillenia*, not being ready, was continued to him, and in lieu of it, he read, at the next session, a paper on Oil of Amber.

QUERY 3d.—Not being answered, was dropped.

QUERY 4th.—On Camphor Water. Postponed until later in the Session.

QUERY 5th.—Relative to the culture of the Poppy, was accepted by E. R. Smith, of Monmouth, Ill. Mr. Ebert read a letter from Mr. Smith, pleading ill health, and unfavorable, wet weather, at the season of planting the poppy in Illinois, as reasons for his not answering.

On motion, Mr. Smith was excused from answering the Query.

At this juncture, Dr. Squibb presented a specimen of Opium, made by Powhatan Robertson, a Virginia planter, in the neighborhood of Lynchburg, in 1864. It was stated that considerable quantities had been made for the rebel hospital department. Mr. Henchman stated that, during the War of 1812, Opium was produced in New Hampshire, and sold for ten and twelve dollars per pound. It was of good medicinal quality, but the manufacturers afterwards adulterated it, and its use was discontinued.

The specimen was referred to Prof. I. J. Graham for examination, to report at the next annual meeting.

QUERY 6th.—Relative to the production of Citric Acid from the tomato, referred to H. N. Rittenhouse, was not replied to, and was continued for 1866.

QUERY 7th.—On Volatile Oil of Peach Kernels.

QUERY 8th.—On Commercial Honey—and its adulterations.

QUERY 12th.—On the Causes of Decomposition in Syrups, &c.



These Queries, referred to E. S. Wayne, of Cincinnati, received no reply, and were dropped from the list.

QUERY 9th.—Referred to Mr. Bedford, was not answered when called for.

QUERY 10th.—On Pumpkin Seeds. Received no response.

QUERY 11th.—On Regulating Temperature. Referred to P. W. Bedford, of New York. Was not answered at this time.

QUERY 13th.—On the use of Glycerin, to prevent the separation of Apotheme in fluid extracts, and other preparations. Was answered by Alfred B. Taylor. This paper was referred for publication.

QUERY 14th.—On Glycerin as a Menstruum. Was answered by W. J. M. Gordon, and the paper was referred for publication. Mr. Gordon believes that Glycerin is applicable to the extraction of various drugs.

QUERY 15th.—Relative to Valerian grown in New England, as compared with that imported from England and Germany. Was not replied to by Mr. Markoe, who stated that Mr. Dolibar, of Boston, had taken it in hand, intending to report to this meeting, but is not yet ready, and desires to have it continued to him; which was granted.

QUERY 16th.—Relative to the Benzine of Commerce. Accepted by A. P. Sharp, of Baltimore. Received no reply.

QUERY 17th.—On the culture of our indigenous drugs. Was not replied to by Wm. S. Merrill, of Cincinnati, and was dropped.

QUERY 18th.—On fermentation and cryptogamic vegetation, as agents destructive to Pharmaceutical preparations, &c. Referred to Mr. Scattergood. Prof. Procter stated that he knew Mr. S. had been long engaged in prosecuting his investigations in reference to this Query, and that he was not ready to report. On motion, the subject was continued to him, with the request that he would finish it at his leisure.

QUERY 19th.—On Stramonium and Atropia. Continued to Prof. Mayer. Was not answered, and was continued to him for another year.

QUERY 20th.—Relative to the Balsamic products of the sweet

gum tree (*Liquidambar styraciflua*). Was replied to by Prof. Procter, and the paper referred for publication.

Prof. Moore stated that *sweet gum* is obtained in the lower counties of Maryland; and the results of an examination made by one of his students exhibited results agreeing with those of the paper just read.

QUERY 22d.—Relative to dispensing Cerates and Ointments. Prof. Moore read the reply to this Query by W. S. Thompson, of Baltimore, and it was referred for publication.

Prof. Moore remarked that it was utterly impossible to get lard in Baltimore that could not be dipped out with a spoon. All the lard contains water and salt.

Prof. Procter stated that he had seen in Philadelphia an arrangement like a dumb-waiter, by which ointments were kept in the cellar, and raised into the store when wanted.

The President had in use a similar contrivance at this time.

Prof. Graham's custom was to buy the leaf-fat and render it himself.

Mr. Butterworth had obtained a sediment from lard, which he supposed was lime.

Mr. Maisch said that large quantities of lard had been offered at the U. S. Army Laboratory, containing from 10 to 12½ per cent. of water, kept mixed by means of a little alkali or borax.

Dr. Squibb went into an explanation of the causes of softness in lard, when unadulterated, as being due to the fat of the exterior subcutaneous layers being more fluid than the leaf-fat. Also, that a fruitful cause of bad lard was the food of the animals, slop-fed hogs having fat less firm than when corn-fed.

Prof. Moore stated that so-called leaf-lard in Baltimore, is lard partly deprived of olein by pressure.

Dr. Squibb spoke of the article called perfumer's lard, made in England, which is odorless, white and consistent.

Mr. Massot was in the habit of rendering leaf-lard for his shop use.

Prof. Procter stated that recent English writers had accused the Americans of adulterating lard with 20 per cent. of potato starch jelly.

Mr. Close had been informed that lard for perfumers' use

before alluded to, was prepared by a steam-heating process, which had been patented in this country by Mr. Grace, and lard is or was made by it in New York.

Query 4th, on camphor water, was now read by Mr. Markoe, was accepted, and referred for publication. The paper states that the camphor water of the U. S. Pharm. is four times as strong as that of the British authority.

QUERY 23d.—Mr. Markoe, having been unable to perform the requisite experiments with the plants as to their insecticide powers, requested to be released from further attention to the subject.

The Business Committee proposed that a Committee of three be appointed by the Chair, to examine the specimens and instruments deposited in the rooms for the inspection of the members, and report thereon to a future sitting.

Messrs. Stearns, Markoe, and Stabler were appointed.

Prof. Parrish exhibited a patent hard rubber vacuum filter, easily operated, intended for use by the apothecary. It consists of a funnel, a diaphragm and neck, with a collar externally, to rest on the mouth of the jar for convenience; the vacuum is created by a hard rubber syringe pump attached to the filter by a flexible tube. The filter was tried with some cloudy syrup and operated with considerable facility.

Dr. Squibb had filtered under pressure, and found it to answer well, but that percolation under pressure does not work well.

Prof. Parrish considered the success of percolation depended on the natural process of capillary attraction.

Mr. Colcord had percolated under a pressure of 40 lbs. to the square inch, and at all temperatures, from near the freezing point to 240° F., and he thinks the principle must be abandoned after two or three years' trial.

On motion, the meeting now adjourned to four o'clock, this afternoon.

*Third Session—Sept. 6th. Wednesday.*

The Association convened at 4 o'clock, P. M. The President in the chair.

Prof. Parrish called attention to the result of his filtering experiment at the previous session, and, on motion, it was voted that he furnish the Executive Committee with a drawing and description of the filtering apparatus for publication in the proceedings.

Mr. A. B. Taylor exhibited specimens of fluid extract of Rhubarb, and fluid extract of Cinchona, preserved by means of glycerin, as recommended in his paper read at the second session.

Mr. Maisch, in answer to Query 21, read a paper on the poisonous principle of *Rhus toxicodendron*. The writer disproves the assertion of Dr. Khittel, that the poison of this plant is due to an alkaloid (ammonia being the only volatile alkaloid present), and shows that its activity is due to toxicodendric acid, an acid peculiar to this plant. Mr. Maisch exhibited a specimen of the aqueous solution of the acid, and crystals of toxicodendrate of baryta.

Query 1, in regard to the seeds of *Cimicifuga*, being called up, was answered by Edward C. Jones, of Philadelphia, in a paper which was referred.

Mr. Ebert, of Chicago, read his paper on the Oil of Amber and its sophistication, in lieu of the answer to Query 2. Several interesting specimens of amber products, including the pure crude oil, and the pure rectified oil, succinic acid, and some adulterated oil of amber were shown by Mr. Ebert, who found that the oil cost him \$1.50 per ounce, when rectified, the amber costing 75 cents per pound, whilst commercial oil is quoted at \$1.50 per pound.

Mr. Bedford stated that his experiments to answer Query 9th were not completed, and he desired to have the subject continued for another year. He also stated that Mr. Higgins, who should have answered the Query on Pumpkin Seeds, had removed to Jacksonville, Florida. On motion Query 10 was dropped.

QUERY 11th.—Relative to the most convenient form of apparatus for regulating temperature below  $212^{\circ}$ , as required in certain Pharmacopœial processes, was now answered by Mr. Bedford in a paper which he illustrated with apparatus.

QUERY 24th.—Referring to the therapeutic properties of



Pumpkin Seeds, continued to Mr. Charles A. Tufts of Dover, N. H., was not answered, on the ground that no cases of *Tænia* had occurred in his locality, and he desired the Query dropped. Prof. Parrish related some instances in which the remedy had proved successful in this disease, in the form of emulsion, and that the remedy was entirely harmless to the patient.

Mr. Close of Brooklyn knew that the mucilage of Slippery Elm had been used with success, and suggested that the question be referred to some Western member. As much as ten per cent. of the population of Ohio are said to be subjects of *Tænia*! It was also stated as prevalent in East Boston.

Dr. Squibb remarked that *Tænia* was much more common in Ohio and Kentucky than elsewhere. He believed good results might be obtained if some member from that section standing in a proper relation to the medical profession would take it up.

Mr. Wiegand called attention to Briggs' method of obtaining the fixed oil by Sulphuret of Carbon and approved of it. Mr. Parrish thought the oil much more repulsive to use than the emulsion, which was not unpleasant.

QUERY 25th.—On Gas Heating Apparatus, referred to Mr. Bedford, was postponed for the present on account of the non-arrival of his Apparatus.

QUERY 26th.—On the best formula for Elixir of Valerianate of Ammonia.

Professor Moore stated that Mr. J. Roberts of Baltimore, by whom the Query was accepted, had left the drug business and was not able to attend to it. If agreeable to the Association he would lay before them the formula for this preparation used by the Pharmacutists of Baltimore. Being invited to do so, he read the formula and exhibited a specimen of the preparation. The recipe originated by a joint action of the Baltimore Apothecaries to resist the use of Hubbel's (Dr. Goddard's) Elixir, much prescribed there.

It was stated that the latter preparation was asserted to contain morphia. Prof. Grahame supposed that it contained valerianate of morphia, but no experimental results had been obtained.

Mr. Maisch hoped discussions of this character would be en-

couraged, as the evil of a continued influx of new patent medicines or secret remedies was on the increase. European Pharmacutists complained bitterly of their influence on legitimate business. In Germany the plan had been adopted of analysing secret medicines and exposing their composition, and he supposed many mysteries might be discovered if the practice was followed here.

Prof. Parrish, several years ago, had a student who selected for his thesis the analysis of a quack pill, then in vogue as a vegetable medicine. Some boxes were obtained at the counter of the proprietor to prevent mistake, and on subjecting them to distillation with iron filings, the Indian Vegetable came over in the form of *globules of mercury*!

George C. Close read a paper on a recipe for Epilepsy, which was, on motion, referred for publication.

Dr. Squibb stated that this was Dr. Brown Sequard's prescription, afterwards used by Echeverria and others. It has been very effectual in some cases of Epilepsy. Bromide of Potassium is the remedial substance.

Mr. Taylor moved, and carried, that all papers which had been read and not referred, be now accepted and referred to the Executive Committee.

Dr. Squibb exhibited another specimen of Virginia Opium, brought by Mr. Brewer of the house of W. H. Schieffelin & Co., and presented in addition to that already furnished.

Dr. Squibb read a volunteer paper on the economy of Alcohol in percolation, which was on motion referred to the Executive Committee for publication.

[This paper is an attempt in a new direction, fractional percolation accompanied by analysis and therapeutic testings. The object of the writer was to determine in this way when a substance was exhausted by careful manipulation in a percolator, so as to ascertain to what extent the quantity of menstruum might be decreased without interfering with the value of the preparation. It is also suggested, that if at a certain point the percolation be stopped the resulting percolate has the medicinal value of the standard finished preparation of the Pharmacopœia; that is to say, in many instances a simple percolate, in bulk three-fourths to seven-eighths of the officinal quantity from 16 troy ounces of a drug, is equivalent in strength to the officinal fluid extract, so that the large remainder of the alcohol directed in the process is consumed to isolate the remaining one-fourth or one-eighth, as the case may be. If now the process be

stopped and the drugs thrown aside it is argued that the result arrived at in the Pharmacopœia is obtained with much less cost; a little of the drug being sacrificed to save a large portion of costly alcohol.—*Editor Am. Jour. Pharm.*]

Prof. Parrish.—I am sure the members will feel greatly indebted to Dr. Squibb for this valuable paper. It is interesting in a commercial and economical point of view, and will save a considerable amount in the preparation of fluid extracts in future.

Prof. Procter.—This paper is starting investigation in a new direction. It not only determines which portions of the percolate are the most valuable in practice, but it gives the relation of one part to the other, and determines by actual therapeutic experiments the real value of the result. The paper is one which we should be glad to receive because it opens a new kind of investigation. I hope that other gentlemen will pursue it with other preparations, and furnish us with facts arrived at in the same careful spirit.

Dr. Squibb here explained the tables connected with his paper, and stated that when the percolate contained only eight grains of extract in the fluid ounce, this extract was inert. He wished to say a word about the inference drawn by Mr. Parrish as to the saving of alcohol. The object of the paper is to show that the formulas in the Pharmacopœia might possibly be advantageously altered by those empowered to alter them, not that I am going to alter them in my own practice, or that I want any body else to do so. I wish every one to adhere strictly to the Pharmacopœia, and do not want any one to say "if the Pharmacopœia Committee do not choose to get together and alter it, we will alter it ourselves; it has been shown to be practicable." My object has been to offer an argument to the Committee of Revision to revise the formulas or to give us some better ones for saving alcohol. It is the cost of alcohol, in a commercial point of view, which has caused the use of fluid extracts to fall off as it has on account of the corresponding rise in their price. If by a change in the Pharmacopœia we can save this, very good; but, until that change is made, we should submit to the loss.

Prof. Parrish did not yield to any one in respect for the National Pharmacopœia, but thought Dr. Squibb too strict. He argued that in making a quantity of fluid extract he was justified in stopping the percolation when the drug was exhausted, if he had not consumed all the specified quantity of alcohol. The Pharmacopœia does not tell exactly what shape of percolater to use, for there are differences in the angles of funnels. Every body must use his judgment, and interpret the Pharmacopœia according to common sense.

Mr. Taylor.—Mr. Parrish might be competent to judge, but it would be unsafe to entrust it to every body.

Dr. Squibb.—The matter comes to this. The Pharmacopœia says that four pints of liquor will exhaust a certain amount of a drug; but you insist that less will do it, and each adopts this "higher law" proceeding. It

is quite possible that both Mr. Parrish and myself might judge when the proper point was reached ; but it is our duty as examplers to say that we must not rely upon our own judgment and teach others so, but go strictly according to the text.

Dr. Pile.—Suppose we say that we will each accept your paper according to his own opinion, and are very much obliged for it.

Dr. Squibb.—Then I have done more harm than good. If I am to displace better authority in giving this information, then Mr. Taylor would say, “you had better have kept that for the committee; it will open the door for others.” I maintain that we are all fallible. I am sorry to have diminished respect for what should be the authority for all druggists.

Mr. Close.—I think we want more individual judgment. If Dr. Squibb can produce better preparations at less expense, he should be at liberty to do so.

Prof. Procter.—I am not quite so strict as Dr. Squibb. If a man can make fluid extracts by using one pint of alcohol where the Pharmacopœia directs two pints, I think he has a right to do so, *provided* the result is the same as that of the Pharmacopœia. I am convinced that the quantity of menstruum is not to be followed in all cases, and was adopted mainly that inexperienced Pharmaceutists might have a safe guide.

Dr. Squibb.—Here comes in another argument. We employ assistants; suppose we trust our improvements to them, who are not skilled—have not the judgment. How can we be certain of the results if they be authorized to depart from the officinal standard?

Mr. Maisch thought Dr. Squibb had changed his mind within a few years, referring to the present officinal formula for compound extract of Colocynth, which was suggested and used by Dr. Squibb long before the Pharmacopœia of 1860 was issued, and which he approved of. In percolation, when working on a large scale, he (Mr. Maisch) had found it necessary to obtain on an average a gallon of tincture from a pound of a powdered drug, or three times the quantity of the Pharmacopœia, to insure exhaustion.

Dr. Squibb explained why he had made the innovation in reference to the use of Scammony resin at a time when good Scammony was difficult to procure, and that the proportion was based on the best authorities connected with the revision of the Pharmacopœia.

Prof. Parrish thought this a clear case of “higher law.” Dr. Squibb is obliged to take some law, and takes the highest; he (Mr. Parrish) was not disposed to decry higher law.

Mr. Taylor.—I should be sorry to see any deviation from the Pharmacopœia. We should bring forward our improvements, discuss them, bring them to the notice of the Committee, and in this way have the desired corrections made, but meanwhile adhere to the Pharmacopœia.

Prof. Procter.—Let us go to work with Dr. Squibb’s article for a text, and carry out the idea. When we have a volume of testimony sufficiently large, let us make the change.



Prof. Parrish.—If we follow the intention of the Pharmacopœia in fluid extracts, in preparing solid extracts we deteriorate them, because (as Dr. Squibb has shown) the last percolations are inert.

Mr. Colcord.—The great object to be attained in preparations is uniformity; this we cannot get if we differ. There must be some standard, and as long as the Pharmacopœia is adopted it should be adhered to.

The meeting now adjourned to 8 o'clock this evening.

*Fourth Session—Wednesday evening. Sept. 6th.*

The meeting was called to order by the President, near the hour adjourned to.

The Executive Committee proposed the following gentlemen for membership:

John J. Fellows, Boston, Mass.	William C. Brigham, Boston, Mass.
James L. Hunt, Hingham, “	William S. N. Allan, Newport, R. I.
George W. French, Boston, “	Solomon Carter, Boston, Mass.
Henry Canning, “ “	

On motion a ballot was held; Messrs. Rittenhouse and Butterworth, acting as tellers, reported the unanimous election of the candidates.

The Committee appointed at the second session to audit the Treasurer's account, reported that they had attended to the duty and found all accounts correct. The report was on motion accepted, but the Committee were continued to report also on the suggestion of the late Treasurer, regarding the payment of the travelling expenses of the Treasurer when attending the annual meetings.

Prof. Parrish moved the following amendment to the Constitution, to be acted on at an early session of the next annual meeting:

*Resolved*, That Section 2, Article III, be amended by substituting the words “Local Secretary” for “Corresponding Secretary;” and that Section 6 be amended to read thus:

“The Local Secretary shall be elected annually at the last session of the annual meeting, and shall be a resident of the city at which the next annual meeting of the Association is to be held. It shall be his duty to assist the Permanent Secretary in his duties, to co-operate with any local committee in making arrangements for the annual meeting, to correspond with the Chairmen of the several Committees and with other members in advance of the meeting, promotive of its objects, and to have custody of specimens, papers, and apparatus destined for use or exhibition at the meetings. He shall act as Secretary at the first meeting, or

until another shall be appointed, in case of the absence of the Permanent Secretary."

*Also*, That in Section 4, defining the duties of the Permanent Secretary, after the words "shall be charged with," the words "the necessary foreign and scientific correspondence" shall be added; so that it shall read, "shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Proceedings of the Association, under the direction of the Executive Committee."

*Also*, That wherever the term "Corresponding Secretary" is used in the Constitution, the term "Local Secretary" shall be substituted.

These resolutions lie over for one year.

On motion of the Business Committee, Ferris Bringhurst, of Wilmington, was invited to exhibit his specimens and offer his remarks.

Mr. Bringhurst exhibited, 1st, a paste brush, with a leather collar attached, which prevents the paste from reaching the hands, and at the same time acts as a cover to the paste pot, keeping out dust, etc., and preventing inspissation; 2d, a tin can, fitted with a bottle, with a layer of porous paper between, up as far as the shoulder, a lid slipping over, to keep out light and dust. The paper retains any oil that may drip. 3d, a sample of simple cerate, made with yellow wax, which prevents rancidity. He used it also in glycerin cream, and in suppositories. For the latter he uses seven parts butter of cacao and one part of yellow wax, which gives consistence in warm weather, and toughness in cold. He gently heats the moulds. When extracts are to be introduced, he liquifies them with a little water, and the cacao butter added in a melted state, thoroughly mixed, and poured into the moulds, which are then refrigerated.

Mr. Ebert preferred using powdered extracts for this purpose, powdered as directed in the Prussian Pharmacopœia, with sugar of milk. He found no difficulty in making suppositories in five or ten minutes, by pouring the mixture into refrigerated moulds.

Mr. Bringhurst thought powdered extracts apt to precipitate, and he was in the habit of adding the fat just before chilling.

Mr. Ebert prevents precipitation by stirring with the right hand and pouring with the left.

Mr. Bringhurst also had used powdered extracts, but desired that there should be some recognized plan for general adoption.

Mr. Markoe found no difficulty with either Taylor's or Parrish's plans, as published.

Mr. Ebert said that liquid extracts were apt to separate, and produce streaky suppositories.

Mr. Bringhurst.—Some physicians prescribe borax ; the suppositories cool quickly, and are hard. He dispenses suppositories in a paper box, with cotton between them.

Mr. Taylor uses a vessel of tin, shaped like a coffee pot, and keeps the powder in suspension by a rotary motion ; and uses yellow wax for hardening, and sugar of milk for extracts.

Mr. Bedford stated that in New York suppositories generally are made by mixing the materials in a mortar and rolling them out.

Mr. Stearns.—In Detroit they are not often prescribed. He moulds them in a tube of the size of the suppository syringe, and then cuts the cylinder into the required number of pieces.

Prof. Parrish prefers spermaceti to wax, and dispenses suppositories in a paper box lined with tin foil.

Mr. Stearns works suppositories as soft as possible, and coats them afterwards with wax, by dipping.

Mr. Bringhurst finds this plan to fail, by the wax cracking.

Mr. Close adds a drop of syrup to every ten grains of cacao butter.

Prof. Procter stated that a member of the British Pharmaceutical Conference had ventilated the question of yellow wax in cerates, and takes the same ground as Mr. Bringhurst in regard to its preventing rancidity.

The Auditing Committee presented the following report :

The Committee to audit the Treasurer's account would recommend that hereafter the expenses of railway or other fare incurred by the Treasurer in going to and from the meetings, be defrayed by the Association.

(Signed,)

F. STEARNS, *Chairman*,

H. HAVILAND,

J. F. MOORE.

The report was accepted, and the Committee discharged.

The question before the Association now being on the adoption of the recommendation of the Committee, Dr. Squibb proposed to substitute "railway and other fare" by "travelling expenses," as in the case of the Permanent Secretary. The amendment was decided in the negative, and the recommendation of the report adopted.

The report of the Committee on Specimens was read, accepted, and referred to the Executive Committee for publication.

Prof. Parrish called attention to a specimen of *Carthamus* on exhibition, labelled "Saffron."

Mr. Markoe.—We sell Safflower for Saffron in Boston almost altogether ; true Saffron is almost unknown here. When people ask for Saffron they mean Safflower.

Prof. Parrish.—We sell Saffron; we should think it an absolute fraud to give Safflower.

Prof. Procter.—In Philadelphia two kinds of Saffron are found in use,—the genuine, and a so-called Saffron composed of Marigold petals, with very little genuine in it.

The question being asked what price the gentlemen from Philadelphia paid for their Saffron, several stated that they paid from \$24 to \$28 per lb.

Mr. Maisch.—Saffron is, or used to be raised to a certain extent by German settlers in the interior of Pennsylvania, which found its way to Philadelphia. It brought its weight in silver coin.

Mr. Heinitsh uses Saffron raised in Pennsylvania, and has bought it as low as \$8 per pound.

Prof. Procter.—Mr. Dix, of New York, brought a variety of specimens of commercial Saffron to the meeting held in New York in 1860, and gave his experience as a drug merchant. He showed that Saffron could not be raised here for commerce, because labor was too high.

Mr. Colcord.—In Boston true Saffron is not saleable, the price being over \$20 per pound in New York. The Saffron sold is not what we understand by dyers' Saffron; it is called Saffron, and is neither the Safflower of commerce nor the pistils of *Crocus Sativus*.

Mr. Markoe remarked that Aqua Cinnamomi, made by the officinal process with true Oil of Cinnamon, soon became turbid.

Prof. Procter explained the cause to be the oxidation of the oil and the formation of Cinnamic Acid, which crystallizes from the water. Chinese Oil of Cinnamon yields a water which remains clear for a much longer time.

S. Mason McCollin exhibited Chapman's Spine Bag. It is largely used in England for sea-sickness, convulsions, &c. It consists of an India rubber bag, divided into three compartments at the top; one being one-third, the second one-half, and the third the whole length of the bag. Ice broken in small pieces is put into the several compartments, so that its effects are extended over the whole surface.

Mr. Stearns had seen the same instrument in New York.

Mr. Ebert read a paper written by James W. Mill, of Chicago, entitled "Fidelity to the Pharmacopœia." On motion it was referred to the Executive Committee for publication.

Mr. Charles A. Tufts, on behalf of the Massachusetts College of Pharmacy, presented to the American Pharmaceutical Association a likeness of our former associate, Charles T. Carney.

On motion, the meeting adjourned at 10.35, P. M., to meet to-morrow morning at 10 o'clock.



*Thursday Morning—Fifth Session. September 7th.*

Pursuant to adjournment, the Association met at 10 o'clock, President Lincoln in the chair.

On motion, the reading of the minutes was dispensed with.

The amendments to the Constitution, as prepared by the late Executive Committee, were called up.

The first amendment altered Art. II., Sect. 2d, so as to require all applicants for membership to make the application in writing, which was adopted.

The second amendment, proposing to strike out the words "signed the Constitution" in Sect. 3d of Art. II., after a long discussion, was put to vote and lost, there being less than three-fourths of the members present in the affirmative.

The third amendment, requiring the payment of the annual contribution in advance, was unanimously adopted.

The fourth amendment, relative to the period of arrearage which shall deprive a member of his right of membership, was lost.

The fourth and fifth amendments, relative to an initiation fee, were, after some discussion, negatived.

The proposition requiring applicants for membership to be "recommended by two members in good standing," was adopted.

The next proposition, relative to re-admitted members paying the old balance, to render them life members, was lost.

The next proposition, relative to an extra assessment, was also rejected.

Likewise, a proposition requiring members changing their residences to notify the Treasurer and Chairman of the Executive Committee.

Frederick Stearns now read two volunteer papers, entitled, "On the Production of Peppermint in Michigan," and "On Rhubarb Wine," both of which were accepted, and referred for publication.

Prof. Alexander H. Everett exhibited specimens of metallic magnesium in the form of ingot, wire and ribbon, and gave some information regarding its uses in the arts, particularly for signal lights, and for photographic and pyrotechnic purposes. He also stated that a company was formed for manufacturing it

on a large scale. The ingot exhibited was of English origin, the wire and ribbon being made in New York.

The place and time of the next annual meeting being called up for discussion, E. L. Massot repeated his invitation extended to the meeting to hold the next annual meeting at St. Louis.

Frederick Stearns spoke in favor of Detroit, and promised to the Association a hearty welcome on the part of the druggists and apothecaries of his city.

Prof. Moore gave a standing invitation from Baltimore to meet in that city as often as convenient.

J. M. Maisch moved that, when we adjourn, we adjourn to meet in St. Louis, next year.

Prof. Parrish offered the amendment to substitute "Detroit" for "St. Louis."

The amendment was adopted, and the motion, as amended, carried.

Dr. Squibb moved to meet next year on the third Wednesday of August, at 3 o'clock, P. M.

Prof. Parrish suggested to substitute "fourth Wednesday" for "third Wednesday," which was agreed to.

The following resolution was now adopted, as a whole, unanimously:—

*"Resolved, That, when we adjourn, we adjourn to meet in Detroit, Michigan, on the fourth Wednesday of August, next year, at 3 o'clock, P. M."*

Thomas S. Wiegand read a paper on the obligations of Pharmacutists in respect to the instruction of those in their employ, which was, on motion, accepted and referred for publication.

The Business Committee informed the Association that Dr. Bartlett was present, having in his possession a paper, accompanied by drawings, on a new form of vacuum apparatus, by our fellow-member, N. Gray Bartlett, of Chicago. Dr. Bartlett, on invitation, read the paper and explained the drawings, all of which were, on motion, referred to the Executive Committee for publication.

[This apparatus is analogous to the one in use, several years ago, by the Shakers at New Lebanon, attached to their vacuum pan. The instrument was operated by a full supply of water derived from a reservoir

on the hill side, above the works. It was not found to answer well, and they have since substituted the air-pump.—EDITOR.]

Dr. Squibb thought there was some fallacy in this apparatus—some want of practicability in application—could not say exactly where it is but was under the impression that the difficulties of condensing in a vacuum will be the main obstacle to its meeting the expectation of the inventor. Water boils in a vacuum at about 67° F., and alcohol at 27° F.; and at the best working vacuum obtained in practice, the temperature at which water can be rapidly driven off is 140° F. Even at this latter temperature, it has not been found practicable to condense the vapor by means of a worm, or in any other way than by injecting water, finely divided, into the vapor. This plan of condensation by injection is entirely inapplicable to alcoholic vapor, for obvious reasons. He further believed that the idea of the apparatus was not new, though creditable to the inventor, and regretted his not being present to give his own reasons.

Mr. Maisch expressed his views as corroborating those of Dr. Squibb.

The Executive Committee brought forward the following names of candidates for membership in the Association, they being endorsed as required by the Constitution.

Alonzo Robbins, of Philadelphia, Pa.

G. A. Newman, of Brooklyn, N. Y.

Messrs. Asahel Boyden, of Boston, and E. L. Massot, of St. Louis, being appointed as tellers, reported their unanimous election.

On motion, Mr. H. W. Lincoln was requested to furnish to the Executive Committee, for publication, a cut and description of the herb cutter which has been on exhibition in the rooms during the meeting.

Dr. Wilson H. Pile stated that his paper\* and apparatus had not yet arrived, and proceeded to give some figures contained in one of his absent essays, regarding the meaning, by the Pharmacopœia, of the term "per cent." in the case of whisky and brandy.

Dr. Pile said the term "per cent." invariably means by weight; and if volumetric per centage is intended in any case, the term must not be omitted. A confusion arises from the fact that manufacturers give the per centage by volume, because this figure is higher than the figure for the per centage of the same liquor by weight, and it makes the liquor appear stronger than it is. But the Pharmacopœia understands per centage to mean by weight only. Where it is admissible, it would be well to indicate both per centage by weight and by measure.

Prof. Procter.—This has been desired by many.

Dr. Squibb.—The difficulty arises from an oversight by Dr. Wood, in not discriminating in his commentary.

\* This paper was read at the Sixth Session. See page 438.

The Chairman of the Committee on Scientific Queries read the report in full, with the acceptances, which was accepted, and referred to the Executive Committee for publication in the minutes.

*To The American Pharmaceutical Association.*

The Committee on Scientific Queries, appointed at the last Annual Meeting, report the following as the result of their labors:

QUERY 1st.—What is the best form of Apparatus by which pressure steam, generated by gas or petroleum heat, may be applied for evaporation, distillation, etc., on a moderate scale, at the working counter of the shop, so that the condensed steam shall return to the boiler, combining efficiency and compactness with economy?

*Accepted by William Procter, Jr., of Philadelphia.*

QUERY 2d.—Pharmaceutical Business—its management.

*Accepted by Frederick Stearns, of Detroit.*

QUERY 3d.—What are the comparative advantages, as to economy and efficiency, of Percolation and the Press?

*Accepted by Dr. R. H. Stabler, of Alexandria.*

QUERY 4th.—What form of mill is best adapted to the use of the Pharmaceutist?

*Accepted by Dr. R. H. Stabler, of Alexandria.*

QUERY 5th.—What material is best adapted for Press Cloths, combining strength, cheapness, and slight absorbing power for liquids?

*Accepted by Dr. R. H. Stabler, of Alexandria.*

It has been asserted that Senna contains crysophanic Acid, and that its activity is probably due to that principle.

QUERY 6th.—Can crysophanic Acid be isolated from either Alexandria or India Senna, and, if so, can it be proven that this Acid contributes in greater or less degree to the purgative power of Senna and Rhubarb?

*Accepted by F. W. Sennewald, of St. Louis.*

QUERY 7th.—In what respects do the sensible properties of the leaves of Hyoscyamus and Belladonna, grown and cured in the United States, differ from the leaves of these plants imported from England and Germany, as presented in commerce; do the latter contain more of the respective alkaloids than the former; and, if so, is this difference due to soil, climate, and culture?

*Accepted by Lewis Dohme, of Baltimore.*

QUERY 8th.—What are the impurities of cheap Commercial Glycerin; can they be removed economically without distillation, so as to render the Glycerin colorless, odorless, and cheap; and, if not, what is the best practical process and apparatus for the distillation of Glycerin with superheated steam?

*Accepted by James F. Babcock, of Boston.*

QUERY 9th.—What are the impurities in Commercial Valerianate of Ammonia; can it be purified, without decomposition, from Butyrate and other salts, when present; if not, what is the best process for obtaining pure Valerianic Acid from the Amylic Alcohol of Commerce, and what are the most eligible forms for administering the salt in question?

*Accepted by N. Gray Bartlett, of Chicago.*

QUERY 10th.—What change can be made in the composition of Emplastrum Picis cum Cantharide that will render its consistence firmer in warm weather?

*Accepted by George C. Close, of Brooklyn.*

QUERY 11th.—What is the best course to be pursued by the apothecary in economizing the alcohol used in preparing fluid extracts, etc.?

*Accepted by N. Gray Bartlett, of Chicago.*



QUERY 12th.—An essay on *Podophyllum Peltatum*, chemical and therapeutical, which shall settle the questions now pending, relative to its active principle or principles.

*For general acceptance.*

QUERY 13th.—Is Commercial Extract of Quassia made by the U. S. P. process; if not, by what process; and can the former process be advantageously revised?

*Accepted by Edward C. Jones, of Philadelphia.*

QUERY 14th.—How far may Alcohol and Ether be substituted by other liquids, in the preparation of the officinal oleo-resins, without detriment to these products?

*Accepted by Henry N. Rittenhouse, of Philadelphia.*

QUERY 15th.—Cotton root is said to be an efficient Emenagogue, and cotton seed to have proved effectual in treating intermittent fever; do these portions of the *Gossypium* possess active principles?

*Accepted by E. W. Sackrider, of Cleveland.*

QUERY 16th.—In the destructive distillation of Tobacco, by the process of the U. S. Pharmacopœia, to get the Empyreumatic Oil, Malate of Nicotina has to be decomposed. Can a better preparation be obtained by liberating the Nicotina with a sufficient quantity of potassa before distillation, reducing the heat to the minimum degree necessary to extract the alkaloid?

*For general acceptance.*

QUERY 17th.—Is the Volatile Oil of *Chenopodium anthelminticum* the only active principle it contains having vermifuge properties?

*Accepted by Thos. S. Wiegand.*

QUERY 18th.—An essay on *Sassafras Officinale*, embracing the whole plant in its relations to Chemistry and Pharmacy.

*Accepted by William Procter, Jr., of Philadelphia.*

QUERY 19th.—What is the best formula for a granular effervescent Citrate of Magnesia, which shall be permanent, readily soluble in water and suitable for general use?

*Accepted by James W. Mill, of Chicago.*

QUERY 20th.—What is the best means by which Cinchona may be deprived of Cinchotannic Acid, so that its alkaloids, in the form of kinates, may be obtained in a permanent liquid form?

*Accepted by William Procter, Jr., of Philadelphia.*

QUERY 21st.—*Oleum Erigerontis Canadensis* is considered to be the active principle of the Canada fleabane; is this correct, or is there another fixed principle possessing medical properties?

*For general acceptance.*

QUERY 22d.—What improvements can be suggested in the preparation of the Officinal Syrup of *Lactucarium*?

*Accepted by P. W. Bedford, of New York.*

QUERY 23d.—Why should not *Lactucarium* be produced in the United States in sufficient abundance and cheapness to supply all our wants; and what are the best practical suggestions for its culture and preparation?

*Accepted by Alfred Mellor, of Philadelphia.*

QUERY 24th.—To what principle does *Scutellaria lateriflora* owe its medical properties?

*Accepted by G. F. H. Markoe.*

QUERY 25th.—What is the best process of benzinating lard and simple ointments; can benzinated lard be employed for mercurial ointment, so as to prevent its strong tendency to become rancid, without hurting its medical qualities, and in what other ointments may this form of lard be advantageously used?

*Accepted by Thomas Dolibar, of Boston.*

QUERY 26th.—An essay on Bees-wax—its Commercial and Chemical history—the best method of bleaching it without injury to its physical and medical properties, and what substitutes have been found that may be used in emergencies. *Accepted by James F. Babcock, of Boston.*

QUERY 27th.—Is Hyoscyamia a permanent principle like Atropia; which is the best part of the plant for its extraction; and what impediments exist to its manufacture as a pharmaceutical preparation for medicinal use?

*Referred to Prof. A. Wadgymar, Ph. D., of St. Louis.*

QUERY 28th.—What is the most eligible form of apparatus yet discovered, or which can be suggested, for preparing pills of uniform size, at will, and can it be adapted to the wants of the apothecary on a moderate scale? *Accepted by Ferris Bringham, of Wilmington, Del.*

QUERY 29th.—What are the advantages and disadvantages of coating pills with sugar or other substances; and what is the best method of coating pills extemporaneously for dispensing?

*Accepted by S. Mason McCollin, of Philadelphia.*

QUERY 30th.—What is the most perfect and reliable process of manipulation to produce *Liquor Ammoniae Acetatis*, pure, and in a neutral or slightly acid condition?

*Accepted by Dr. W. H. Pile, of Philadelphia.*

QUERY 31st.—It having been satisfactorily ascertained that the actinic (or chemical) rays of light are intercepted by orange-colored glass, so as not to injure drugs and medicines, it is queried in what way this means can be most eligibly and satisfactorily applied, in the shop or store room, based on the results of trials in various ways.

*For general acceptance.*

QUERY 32d.—What are the best approximate methods of testing the extracts, fluid extracts, and tinctures, so as to increase the accuracy and certainty of the means of describing and judging of these.

*Accepted by Edward Parrish, of Philadelphia.*

Prof. Moore presented the report of the Committee relative to arrearages, &c., referred at a previous session.

Dr. Squibb moved that the report be accepted and adopted, and that the Committee be allowed further time to complete their report.

After some discussion by Messrs. Maisch and Stearns, the report was disposed of in accordance with the motion of the Chairman of the Business Committee.

James T. Shinn, offered the following resolution, which was seconded and carried:

*Resolved*, That the heartfelt thanks of the Association be tendered to the Massachusetts College of Pharmacy, and the members of the profession in Boston, for the hospitable and courteous attention bestowed upon their guests, rendering their visit eminently agreeable, and affording food for pleasant recollection in the future."

The Association then adjourned until to-morrow morning at 8 o'clock.

*Friday Morning—Sixth Session. September 8th, 1865.*

The Association was called to order at 8.30 A.M., the President in the Chair.

In the absence of the Secretary, Mr. Wiegand, the Chairman of the Executive Committee, was appointed Secretary *pro tem*.

Mr. Bedford exhibited and explained various kinds of gas-heating apparatus. He stated that his paper in answer to query No. 25 was not finished, and he desired the privilege of finishing it for publication.

On motion of the Chairman of the Business Committee, it was resolved, that the paper of Mr. Bedford be received as if presented, and that the writer be allowed time to complete it and hand it in for publication.

Dr. Squibb gave a short description of a gas heating apparatus with a fire-clay lining.

Prof. Procter alluded to Bullock & Crenshaw's gas apparatus, used with a fire-clay cylinder, and said that they lay great stress on the value of this clay cylinder, which absorbs heat and gives it out, tending to equalize the effects.

Dr. Pile and others spoke on the subject.

The Business Committee stated that Dr. Pile's paper and specimens had arrived, and proposed that the latter be examined by the Committee on Specimens, and be incorporated into their report, which was adopted.

This Committee, also, brought up the subject of an increase of the annual contribution to three dollars, as unfinished business of last year.

At the suggestion of A. B. Taylor to place an extra assessment of one dollar for the next year upon each member, the Executive Committee presented the following:

"Whereas, The expenses of the Association have been greatly increased within the past four years through various well-known circumstances; therefore, 'Resolved, that an additional special assessment of one dollar for the year 1866 be required from each member, and that the obligation to meet this assessment by members be the same as those which apply to the annual dues.'"

Considerable discussion took place, Dr. Squibb, Messrs. Taylor, Tufts, Rittenhouse, Shinn, Procter, Markoe, Butterworth and

Moore, speaking in favor, and Prof. Parrish in opposition. The latter taking the ground that there were many young members struggling along to whom the expense would be a burden.

The resolution was adopted.

The Business Committee moved the following resolution, which was adopted:

*Resolved*, That the Executive Committee be authorized to fix the price at which the Proceedings shall be sold."

The Business Committee introduced the recommendation to charge life members with the price of the Proceedings; during the discussion it was stated that such a course involved an alteration of the Constitution, and could only be accomplished by the unanimous consent of the life, and all other members.

The motion to charge life members with the Proceedings was lost.

It was also, resolved, to postpone indefinitely the subject of prizes, prize queries and medals.

A suggestion to appoint the Committee on Credentials for the next meeting at this time, met with strong opposition, and was lost.

Prof. Parrish offered the following, which was unanimously adopted:

*Resolved*, That the permanent Secretary be directed to have custody of the specimens, models, pictures, plans, books and periodicals belonging to the Association, with the privilege of depositing them in the Hall of the College of Pharmacy of Philadelphia, if that Institution should offer facilities for their proper storage and exhibition.

Dr. Squibb said there was a portrait of the late Mr. Carney, presented to the Association by the Massachusetts College of Pharmacy. I move, as Chairman of the Business Committee, that this picture be accepted, with the thanks of the Association to the Massachusetts College of Pharmacy, and that it be placed among the articles in possession of the Association. The motion was carried.

Dr. Squibb stated that the only business to come before the Association was the recommendation of the President in regard to the Internal Revenue Law, as it affects licenses and sales and the cost of alcohol used in Pharmacy.



Prof. Parrish read a paper on the English Revenue Law, with special reference to alcohol, which was accepted and referred.

Dr. Squibb. This paper forms a good starting point for the subject before us; it shows the amount of machinery adopted to adulterate alcohol for pharmaceutical purposes, and yet the only good purpose claimed to be subserved is that ether and chloroform may be made from methylated spirit, since it is admitted on all hands that for tinctures and the general uses of Pharmacy it is totally unfit. To ether and chloroform, which are manufactured on the large scale, the argument is not prominently applicable, these articles not coming within the scope of general pharmacy, as do tinctures, &c. Even this adaptation to making ether is doubtful, since in my experience the presence of any of these hydrocarbons tends to the production of unclean ether. Of late years, and particularly since the rise in alcohol, manufacturers have in some way, by close distillation or otherwise, debased the quality, so that from 95 per cent. alcohol, from which ether used to be well made, it cannot now be made clean; made from the same alcohol, by the same apparatus, by the same process, it is not clean enough for anæsthetic purposes; and to obtain it so, it has become necessary to resort to the use of Cologne spirit. Just such a step had to be taken, some years ago, when 95 per cent. alcohol was as rare as Cologne spirit is now. Good clean ether could then be made from 85 per cent. alcohol—as clean as was afterwards made from 95 per cent., or now from Cologne spirit. As the market for alcohol rises, so the makers produce worse alcohol, containing more hydrocarbons. The legitimate uses of Pharmaceutists are not benefitted by any adulteration of spirit. Besides this, the price of alcohol does not affect the Pharmaceutist to the extent that is urged. Whatever the price of alcohol, he obtains the same profit he formerly did; so do the manufacturers' profits remain the same. Hence, I maintain that the interests of Pharmaceutists are not so deeply involved in this question as at first sight they appear to be. The consumer is the person who pays. If we wish to diminish the price to the consumer, it is well to take up the question. In regard to the machinery necessary to lessen the price of alcohol to Pharmaceutists, as described in Mr. Parrish's paper, I suppose that a similar plan might be adopted here; but I cannot see in what manner it could conduce to the benefit of the Pharmaceutist, as such, independently of the considerations which exist in reference to the consumer.

The next point is this: the object of the law is to raise revenue, which is rendered necessary by debt. This revenue must be levied and paid by taxes upon articles of consumption. Is not alcohol as good an article for taxation as any other? Should we desire to evade these taxes in their application to Pharmacy, simply because we have so careful a scrutiny of the interests of the consumer? Should we not rather allow them to be imposed without objection on our part? If, however, after a fair trial, it should be found that it bears unequally, that it falls with more severit

upon us than upon others, then we can take the matter up, and bring it before the proper authorities. I am not opposed to any measures having in view an equalization of taxation, so far as they are intended to equalize; but my impression is that every step that is taken, by any special business, or any special interest, to reduce taxes, is a step towards something like repudiation. I hope nothing will be done by this Association in that direction. Let us come up manfully and willingly and pay these taxes, and accept also the fact that the people in authority at Washington know what they are about. Let us pay such taxes as may come upon us, until the time comes when we can show that they are not equitably placed. I am opposed to any interference with the National legislation upon the subject of taxation of alcohol. With regard to licenses, I think that, upon fair representation of all the facts bearing upon the case, Congress has decided that the laws, as they exist, are necessary. There are, undoubtedly, some minor points, in regard to which fair objection may be made. For instance, we take out a manufacturer's license, and pay a duty of six per cent. A manufacturer of patent medicines pays a stamp duty only, which, as the law now stands, is but four per cent. A legitimate Pharmaceutist, therefore, has to pay a larger tax than those engaged in the manufacture of illegitimate preparations. The operation of the law, therefore, is to encourage the sale of quack or patent medicines, to the prejudice of the legitimate business of the apothecary. Upon this fact being brought before the proper authorities, I have no doubt that the law will be amended, so as to make the stamp duty exceed the sales duty. Now, it is perfectly fair to represent anything of that kind, and let them rectify it, if they please. If not, do not let us undertake to make them do it. Let us rather rest under it. Forbearance and self-denial should be cultivated in an association like this—now, if ever. Here we should give all our influence against every action tending, even in a lateral direction, towards repudiation.

Mr. Colcord.—The member from Brooklyn has expressed my opinion, exactly. I do not see why this Association should undertake any action in this matter, when there is no possible advantage to be derived, even if they succeeded in amending the law. The principles upon which we should stand, and the way in which we should meet this question, have been exactly stated by Dr. Squibb. A year or two ago, there was a tax put on patent medicines—one cent on every twenty-five cents—four for a dollar. They raised a committee to go to Washington, and they wanted me to go on that committee. I told these gentlemen, "If you raise a committee to show the Government where it can advantageously lay an additional tax, or where they can put a tax on something better, I will go." The tax is none too large. It comes upon a class who can afford to pay it. The only difficulty is that it bears unequally. If we can equalize the taxes, it will be all right.

Prof. Procter.—Dr. Squibb spoke of the price of alcohol in its relation

to the profits of the Pharmaceutist. There is another view of the matter which he did not take. I think, if we let the price of alcohol remain as it is, we must stop making fluid extracts. We must either stop making these extracts—for the poor cannot afford to pay the price we must ask for them—or we must seek some means of getting alcohol cheaper. I supposed that our action was to be directed to this point, and that some method was to be devised by which the Pharmaceutist could obtain alcohol to use in his business, without being subject to the taxes, which are properly enough laid upon the consumer of the article, as a beverage. A very large proportion of the alcohol is used in the form of tinctures. It does not do to say that the apothecary gets the same profit, or that they can add the same per centage. If we did, we should charge fifty cents per ounce for tinctures, whereas we charge nearly the same price as heretofore. We have to meet a class of customers who cannot afford to pay present prices. The physicians have come to prescribing alcohol to a very large extent. This makes it additionally onerous. I speak from every day experience in my store, when I say that the poor cannot afford to pay the prices for fluid extracts which we are compelled to charge.

Dr. Squibb.—There is one point connected with this matter of the poor to which I wish to call attention. This same class of poor, who formerly earned but one dollar to one dollar and a half per day, now earn two or three dollars per day. The mechanics, those working in shops, whose families are to be medicated, now get three dollars and fifty cents per day, where formerly they received but two dollars per day. They are abundantly able to pay for the increased cost of medicines. They demand additional wages for that. A part of these additional wages justly belong to the apothecary, and, through him, to the Government. I have some mechanics in my employ, whose wages have been increased to three and a half per day, upon the very ground that, as consumers, they must pay these advanced prices. Now, these men do not, on the average, make more than five, and often only four days in the week. They live better now to work five days than they did to work six. The reason is, because Mr. Procter charges the old prices for medicines, while they are demanding increased wages under the new order of things. Their families live well. Butchers will tell you that the high cost of meats is owing to the fact that families that formerly bought second and third quality pieces, are now able, owing to the increase of wages, to buy the best. Nobody wants the second and third pieces. I mention these facts, to show that these people are able to pay for the medicines they require.

Mr. Colcord.—It is not the apothecary's business to look after the [pecuniary] interests of the patient. That belongs to the physician. He should write recipes adapted to the means of his patients. If he wants to cheapen things for his patients, he can write for cheaper remedies more easily than the apothecary can give what is ordered by the physician at half price. For instance, if senna infusion is wanted, let the physician

prescribe senna, and let the patient infuse it himself. Where the apothecary does it, according to the Pharmacopœia, he must be paid for it a good price.

Mr. Nichols.—If the increase in price [of alcohol] was not so exorbitant, we should not have reason to complain; but the increase is not in proportion to other things; the increase is greater. We used to buy a pint of alcohol for four and a half cents; now we pay sixty cents. This margin is very great; so great that it bears very heavily on the poor. We ought to look at that. There are two views to take: the patriotic and the benevolent. Many depend on the druggist for their medicines, which are a serious expense to them. If means could be devised to reduce the cost of alcohol, it would yield as much revenue to the Government as it does to-day. This heavy tax seems to me to be striking a heavy blow at the industry of the country. We have lost, and are now losing entirely, the manufacture and sale of those articles into which alcohol enters. There are none shipped to the Provinces, none to Melbourne. These sources of revenue have all dried up, owing to this increase in the price of alcohol. I am inclined to think there should be some action taken in relation to the price of alcohol. The loss in manufacturing is great, and the druggist does not get back its cost. He cannot charge for tinctures in proportion to its cost. In relation to Dr. Squibb's views, it seems to me that the argument relative to increased wages must be received with some reservation; as this greater amount is consumed in the price of necessities of living, but little is saved. I have talked with Congressmen on this point. They are willing to act on any feasible remedy.

Dr. Pile thought that a more important point was in relation to the license. We are required to take out a license for selling alcoholic liquors, legitimately used as medicines. We are obliged to take out, in addition, a tavern-keeper's license to sell brandy, wine, and whisky, as medicines. I think this a serious mistake made by the assessors. It was declared in Philadelphia that every druggist must take out a tavern-keeper's license. A physician orders three or four ounces of brandy: some assessors declare that we cannot sell unmixed liquors, by prescription, without a license. Then, again, some determine that all articles we make, make us manufacturers, and we must take out a manufacturer's license, in addition to the others; and, if the amount we manufacture for our sales is over \$600, we must pay 6 per cent. additional duty or tax.

Dr. Squibb believed this trouble to arise from the difficulty of discrimination on the part of Congress in legislating for a class of dealers who have among them many who do not hesitate to be dishonest, in this matter of selling liquors as a beverage. As regards irregularity in the action of assessors, this is a matter to be reformed, and may be done by proper representations to the proper authority. To tax apothecaries as liquor dealers is right when they sell it indiscriminately, to increase their profits, as many will do. Not to have a license would be to open another loop-



hole to illegitimate traffic. Whisky is only a few cents a gallon more than the tax. It cannot be made for less than sixty cents per gallon. Many think it is illicit distillation that keeps whisky down in price. This is probably true of all districts. Don't let us obstruct the progress of the machinery which government has been compelled to put in action for the protection of the revenue. Let us be patient under the burden, and when we determine the real character and source of our grievances, represent them to Congress in an unassuming way, and they will be examined and redressed.

Prof. Procter.—I think we should be willing to let Congress do its best in such a way as it sees fit, but I do not see why we should let our grievances pass unnoticed. In the last Pharmacopœia certain liquors were made official, and we are therefore bound to keep them. We cannot sell unmixed brandy, wine, or whisky, without having a license. The physicians order these liquors, and we must break the law or take out a license. If we take out a license, it is natural to suppose that we should want to do enough business to pay for that license. We increase the quantity sold; this puts temptation in the way of our clerks and apprentices. Hence some apothecaries have come to be mere liquor dealers; they take out only a liquor dealer's license, because that covers everything. We must either say "we cannot put up your prescriptions," or, getting a license, we must open dram shops,—for it will gradually happen that liquors will be dealt out otherwise than as medicines, if sold by license.

Prof. Parrish regretted this discussion has involved so many points. It is a very extensive subject. He was in favor of taxing the apothecaries who sell liquors otherwise than by physicians' prescriptions, and he did not think sales of liquors by prescription were now taxable. The apothecary is bound to see that the prescription is legitimate, and not false; he believed the law would uphold us in this course. He was opposed to apothecaries selling liquors, and was conscientious about it; refused all but by prescription; sends such customers away unsatisfied. He thought the stamp acted as a premium to quackery, when it was meant to operate against it. The quack pays only four per cent.; the manufacturer of fluid extracts, etc., for legitimate use, six per cent. We should interfere, and prevent this unequal taxation. Dr. Squibb says that wages are very high. How is it with the poor women whose husbands have died by the war,—many of them with families? Go and see where they live, and how they get a living; find how intemperance and vice are crushing them down, and how they die for want of proper medical care. It is upon these people,—the real and wretched poor,—that the law is a burden, and its action oppressive.

Then as regards the use of alcohol as fuel. The tax has stopped this, and cut off a vast revenue if the price could be kept so as to yet use it for burning. Mr. Parrish suggested the English plan of giving bond for its legitimate use, and thus lift the duty,—the distiller selling under the direction of an excise officer.

Dr. Squibb still believed it as impossible to discriminate in favor of the poor; the government would gladly do it, if possible. It is impossible to discriminate in favor of pharmacutists, because as a class they are no more honest than other people. They are no more to be trusted than other people. This is the real difficulty. Procter's point in regard to taking out licenses as liquor dealers, and the stimulus this offers to every apothecary, is very good indeed; it can only be answered in this way: It is one of the abuses that Congress did not provide for, and can be remedied by legislation, on proper representation. Meanwhile let us wait till the proper time arrives. As regards the inequality of taxation in the stamp and manufacturer's duties, this also could be changed. In regard to the bearing of these heavy taxes upon the poor, and to the necessity of our coming to their relief, it is well known that they are very largely the consumers of quack medicines, and to have them will pay any price; whilst they refuse a fair price for good laudanum. He thought the taxes on these quack medicines should be increased, to protect regular pharmacy, and to check the harm done by their indiscriminate use.

The discussion was continued by Mr. Nichols and Mr. Colcord. Prof. Graham had been much interested, but thought the discussion had been continued as long as it was profitable.

Mr. Close moved that the whole subject be referred to a committee.

Dr. Squibb wanted the duties of such committee, if decided on, to be clearly defined. He was about to suggest the postponement of the subject till next year, the members meanwhile considering it carefully, and then come prepared to act. Why not all be a committee?

Prof. Procter favored the appointment of a committee to bring the subject before the Committee on Ways and Means. He believed a committee could facilitate the objects in view,—viz.: the reduction of the tax on alcohol for pharmaceutical and chemical purposes, and the avoidance of a license for selling liquors by physicians' prescriptions, for medical purposes. A committee could be authorized to address the proper authorities, have consultations with them, and thus avoid the delay of a year.

Dr. Squibb thought a committee could investigate the subject, and be prepared to give information to the Committee of Ways and Means, if invited to do so, but doubted the propriety of intruding our views upon that Committee, who were tenacious of their opinions and methods of action.

Mr. Barr suggested that every one write his views, and present them at the next meeting.

Mr. Colcord thought a committee of five would give a report of its Chairman only; still he should like a committee appointed, and each member of it to report.

Mr. Taylor also suggested that each member should report separately.

After further suggestions by Dr. Squibb, Mr. Taylor, and others, it was

*Resolved*, That a committee of five be appointed to take into consideration the whole subject of the Internal Revenue Law in its relations to the

objects of the American Pharmaceutical Association, with special reference to the alcohol question, with authority to confer with the Committee of Ways and Means of Congress, and the Commissioner of Internal Revenue; and who shall report to the Association at its next meeting."

The resolution was adopted, and the President authorized to appoint the Committee at his leisure, and notify the members of his action.

Mr. Tufts moved the appointment of a committee to report rules of order for the meetings, which was not agreed to.

The Committee on Specimens presented some additions to their former report, which were accepted.

On motion of Prof. Parrish, it was

*Resolved*, That the thanks of the Association are due and are hereby tendered to the corps of Reporters who have so faithfully attended our several sittings.

There being no further business before the Association, the minutes of the several sessions were read, corrected, and adopted, when, on motion, the Association adjourned, to meet at Detroit, Michigan, on the fourth Wednesday of August, 1866, at 3 o'clock, P. M.

J. M. MAISCH,  
*Recording Secretary.*

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#### ON TINCTURA FERRI CHLORIDI, U. S. P.

By J. C. WHARTON, of Nashville, Tenn.

Among the changes made in the last (12th) edition of the U. S. Dispensatory, that of "Tinctura Ferri Chloridi" is one of the most important. As those accustomed to read and practice the formulæ of this work are aware, the present manner of preparing this tincture was mentioned in a "note to the eleventh edition" of the U. S. D.

Though possessing peculiar merits, there has been some difficulty experienced in the manufacture of a uniform article. This consists chiefly in the rapid precipitation of a considerable portion of sesquioxide of iron, and in the dark greenish, instead of its bright golden color.

Referring to the cause of these defects, it will be seen, that the former arises from the faults of manipulation, and the latter from insufficient oxidation of the metal, as a little reflection upon

the U. S. P. formula, here given will show. The recipe is as follows :—

“Take of Iron in the form of wire and cut in pieces *three troy-ounces* ; Muriatic Acid *seventeen and a half troyounces* ; Alcohol three pints ; Nitric Acid, Distilled Water, each, a sufficient quantity. Introduce the Iron into a flask of the capacity of two pints, pour upon it *eleven troyounces* of the Muriatic Acid and allow the mixture to stand until effervescence has ceased. Then heat it to the boiling point, decant the liquid from the undissolved Iron, filter it through paper and, having rinsed the flask with a little boiling distilled water, add this to it through the filter. Pour the filtered liquor into a capsule of the capacity of four pints, add the remainder of the Muriatic Acid, and, having heated the mixture nearly to the boiling point, add *a troyounce and a half* of Nitric Acid. When effervescence has ceased drop in Nitric Acid, constantly stirring, until it no longer produces effervescence. Lastly, when the liquid is cold, add sufficient distilled water to make it measure a pint and mix it with the Alcohol.”

It will be observed, that the Muriatic Acid is here divided into two portions, the second of which is added to the solution of the Protochloride of Iron formed by the first. This is done in *anticipation* of the precipitate of Sesquioxide of Iron, which would otherwise result, when the Nitric Acid is added. Here is evidently the *source of the first defect* above alluded to ; for when the mixture is heated “*nearly to the boiling point*” and the Nitric Acid is added until effervescence is no longer produced (as directed) a loss of Muriatic Acid will almost inevitably occur, from the heat and the effervescence. Consequently a precipitate must be thrown down, from insufficiency of acid. To remedy the evil, the Muriatic Acid should not be added until near the close of the operation after the chemical change, of the *proto-chloride* to that of sesqui-chloride and sesquioxide of Iron, has been produced by the Nitric Acid, and the mixture has nearly cooled. The sesquioxide will then be readily dissolved, forming a complete solution of Sesquichloride of Iron.

There are advantages attending this method, beyond that of securing a reliable tincture, namely : the more rapid oxidation of the Iron by the Nitric Acid, and the requirement of smaller



vessels than in the former method, both of which are the consequences of employing the solution of Protochloride in an undiluted state. The formula, here given, is a modification of the one above and has yielded, in the experience of the writer, very satisfactory results, and constant success has attended it:—

Take of Iron wire in small pieces,	℥iij.
Muriatic Acid,	℥xviiss.
Alcohol,	Oij.
Nitric Acid,	
Distilled Water, aa	Q. S.

Introduce the iron into a flask of the capacity of two pints, and pour upon it *eleven troyounces* of the Muriatic Acid and allow the mixture to stand until effervescence has ceased. Then boil until the odor of *Sulphuretted Hydrogen* cannot be detected in its vapor, decant the liquor from the undissolved Iron, filter it through paper, and having rinsed the flask with a little boiling water, add this through the filter to the rest of the liquor. Pour this into a capsule of the capacity of two or two and a half pints and heat to the boiling point, add by degrees Nitric Acid until it no longer produces effervescence by fresh additions or until the liquor has changed to a *yellowish brown color*. Let it nearly cool and add the remainder of the Muriatic Acid, stirring frequently, until the precipitate of Sesquioxide of Iron is dissolved; add sufficient distilled water to make it measure a pint and mix with the Alcohol. It will yet generally have a greenish color. This arises from insufficient oxidation of the Iron, as before remarked, and may be remedied by exposing it in open, wide-mouthed vessels, for a few days, to the action of the air and light. It is remarkable that during this exposure, when *etherification takes place*, a singular precipitate is produced, which when washed with diluted Muriatic Acid and water, proves to be a light, bulky, white substance much resembling Sulphate of Quinia in appearance. It is tasteless, slightly soluble in water and diluted acids. It may be heated to redness without change and seems to be an organic compound of Protoxide of Iron; of which a specimen has been furnished to Professor R. E. Rogers, of the University of Pennsylvania.

*Sept. 27th, 1865.*

## ON A PROCESS OF FRACTIONAL CONDENSATION: APPLICABLE TO THE SEPARATION OF BODIES HAVING SMALL DIFFERENCES BETWEEN THEIR BOILING POINTS.

BY C. M. WARREN.\*

It is well known that the process in general use for the proximate analysis of mixtures of volatile liquids,—viz.: that of simple fractional distillation, either from a tubulated retort or from a flask with bulbs, as proposed by Wurtz,†—affords but very imperfect and unsatisfactory results, and not unfrequently leads to gross errors and misconceptions, except in those cases in which the boiling-points of the constituents are widely different, or in which some auxiliary method can be advantageously employed.

The want of a more efficient process for effecting such separations has long been recognized. There are numerous natural and artificial products, of the highest scientific interest,—such as petroleums, essential oils, tars, and other mixtures of oils obtained by the distillation, under varied circumstances, of bituminous, vegetable, and animal substances,—of which it may at least be said that we have but very imperfect knowledge,—I might almost say no knowledge, except such as could be derived from the study of very impure materials,—still mixtures of different bodies,—with which, instead of the pure substances sought for, chemists have felt compelled to content themselves, as the best results which they were able to obtain by the means at their command.

In repeated instances, apparently after persevering and protracted efforts, investigators have been forced to assert either the impossibility, or their inability, to obtain, from such mixtures, bodies of constant boiling-point,—a property which is generally received as a test of purity for liquid bodies.

I may here specify a few recent instances of this kind.

1. Warren de la Rue and Hugo Müller, in their paper‡ entitled “Chemical Examination of Burmese Naphtha and Rangoon

\*From the Journal of the Acad. Arts and Sciences, Boston, May 10, 1864.

† Annales de Chimie et de Physique, [3], xlii. 132.

‡ Proceedings of the Royal Society, viii. 221.

Tar," after detailing the preliminary treatment by distillation in a current of steam, add that "A further separation of the various products was effected by repeated fractional distillations; but no absolutely constant boiling-points could be obtained, notwithstanding the great number of distillations and the large quantity of material at command. It is true that considerable portions of distillates could be collected between certain ranges of temperature, tending to indicate a constant boiling-point; nevertheless, it soon became evident that distillations alone could not effect the separations of the various constituents, and that recourse must be had to other processes." The other processes resorted to were, treatment with sulphuric and nitric acids, either separately or mixed; but still with very imperfect results. This acid treatment, which was first proposed by De la Rue, and subsequently employed by C. Greville Williams,\* Schorlemner, and others, will be further noticed below.

2. Frankland,† in speaking of a mixture of the hydrocarbons of the formulæ  $C_n H_n$  and  $C_n H_{n+1}$  (now generally considered as  $C_n H_{n+2}$ ), which have a difference of  $6^\circ$  to  $7^\circ$  C. between their boiling-points, says, "The separation of two such bodies by distillation alone is impossible;" and suggests that the employment of anhydrous sulphuric acid may accomplish the object by dissolving out the body of the formula  $C_n H_n$ .

3. And so recently as 1862, Schorlemner,‡ in his first paper "On the Hydrides of the Alcohol-Radicals existing in the Products of the Destructive Distillation of Cannel Coal," remarks that "it was, however, found impossible to obtain a product of constant boiling-point by repeated fractional distillations;" and he also had recourse to the acid-treatment above referred to.

4. Pebal,§ after an elaborate research on the petroleum from Galicia, in which Wurtz's bulbs were employed, and also Eisens-

\* Philosophical Transactions, 1857, 447.

† Quarterly Journal of the Chemical Society, 1851, 3, 43.

‡ Journal of the Chemical Society, xv. 419.

§ Annalen der Chemie und Pharmacie, cxv. 20, asserts the "Unmöglichkeit, das Gemeage durch fractionirte Destillationen zu entwirren."

tuck,\* who made an extended investigation of the petroleum from Sehnde, near Hanover, also with the use of Wurtz's bulbs, both assert in the most positive manner the impossibility of separating from petroleum, by fractional distillation, products of constant boiling-point.

Such is the general character of the results obtained in the attempts which have been made to separate the constituents of such mixtures by fractional distillation.

The treatment with strong acids, etc., as an auxiliary to the common method of fractional distillation, which is claimed to have given good results in some cases, is open to serious objections in its application to mixtures of unknown substances, as must be readily apparent. The further consideration of this subject is reserved for another occasion, when I shall submit the results which I have obtained by my process in the study of mixtures almost identical with some of those in the investigation of which the acid process has been employed. I shall then be able to show that the results obtained by that process are, to a considerable extent, inaccurate and by no means exhaustive; and that it is still of the highest importance to have a process which shall be generally applicable in all such cases, without resort to any harsh or uncertain treatment.

With regard to the value of constancy of boiling-point above referred to, as a test of purity of a liquid substance, I may here say that, without scarcely lessening the importance of obtaining constancy of boiling-point, before resorting to harsher treatment, in the study of mixtures of unknown substances, I think I shall be able to show, on another occasion, that this property is not necessarily indicative of so high a degree of purity as has generally been supposed; and that a body may have a constant boiling-point, and yet contain enough of a foreign substance to

\* *Annalen der Chemie und Pharmacie*, cxiii. 169, says as follows: "Mit den 5° zu 5° aufgesammelten Destillaten wurde die fractionirte Destillation weider von Neuem vorgenommen, aber nachdem diese Operation sieben Wochen mit etwas 50 Pfund Steinöl fortgesetzt worden war, erhielt ich doch kein Product von irgend constantem Siedepunkt. Nach diesen Versuchen halte ich es für Unmöglich, das Steinöl durch fractionirte Destillationen allein in Producte mit constantem Siedepunkt, zu scheiden."



appreciably—and, in delicate cases, seriously—affect the determination of its constitution and of some of its other properties. But in no such case have I yet found that the removal of the impurity by chemical means has essentially changed the boiling-point,—i. e., never to the extent of  $1^{\circ}$  C. of temperature. I propose, at a future time, to study this question synthetically, operating with pure liquid substances, with the view to determine, in a few cases, how much of a foreign substance may be present,—which would probably be variable in different cases,—without sensibly affecting the boiling-point. A solution of this question would, I think, be of considerable practical value in some instances.\*

*Of the new process.*—The chief distinctive feature of my process, as compared with the common one, consists in this,—that the operator has complete and easy control of the temperature of the vapors given off in distillation; and consequently can readily cool these vapors to the lowest limit of temperature which the most volatile portion, under the circumstances, is able to bear and retain its vaporous condition. It will be seen at a glance that, under these conditions, the operator has it in his power to secure in any case the very largest possible amount of condensation of the heavier from the lighter vapors. The liquids resulting from the condensation of the less volatile portions of course fall back into the retort, while the vapors of the more volatile parts continue to go forward to a cold condenser, descending in the opposite direction, from which the condensed product falls into a special receiver. In this manner he is able to obtain, in each successive operation, a series of products which shall contain the minimum quantity of the less volatile constituents, which a single distillation is capable of affording.

Of the common process, on the contrary, nearly the reverse of all this is true: the operator having no control whatever; being forced to receive the vapors at the temperature which they naturally acquire in passing from the retort, and laden with

\* Since this was prepared for the press I notice that late experiments by Berthelot go to show the correctness of my conception of the value of constancy of boiling-point, as above stated.

such proportion of the less volatile bodies as may be carried forward with them.\*

In the new process, perfect control of the temperature of the vapors is secured by simply conducting these vapors upward through a worm contained in a bath, *aa*, figs. 1 and 2, the tem-

\* The only apparatus, of which I have any knowledge, which can be regarded as bearing any analogy to my own, is that employed in the rectification of alcoholic spirits, on a manufacturing scale. In one of the older forms of this apparatus, that of Solimani, to which my attention was first called by a friend, after my process had been in use more than a twelvemonth, the temperature of a dephlegmator is kept within such limits as to give alcohol of any required strength more readily than by the common methods. The mode of construction of this apparatus is, however, only adapted to manufacturing purposes, and it could not be utilized in the more exact experiments required in scientific research. Either on account of its complication, or some other cause, the apparatus of Solimani has, I believe, long since been abandoned.

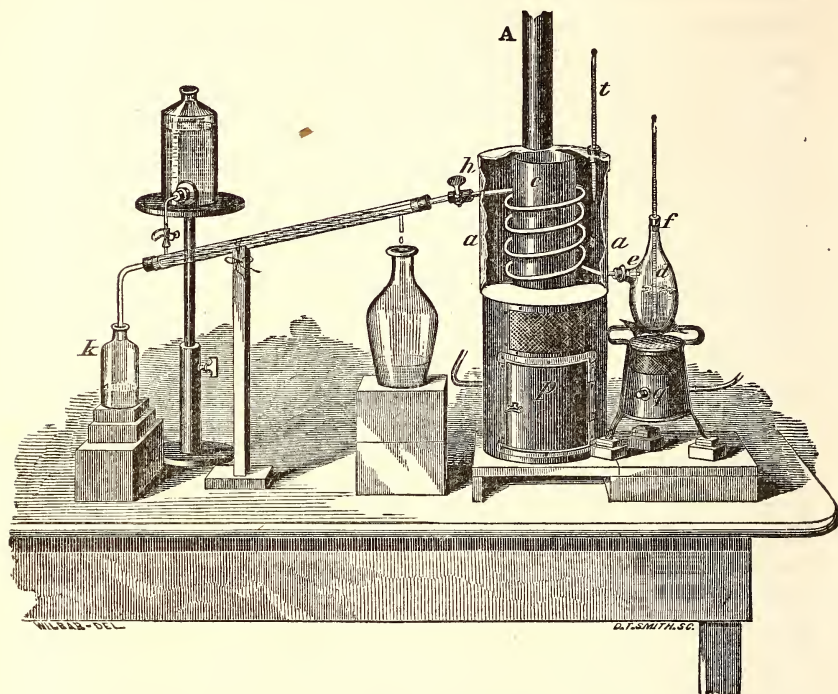
Mansfield (*Quarterly Journal of the Chemical Society*, 1849, i. 264), observing that "the boiling-point of benzole is the same as that of alcohol of sp. gr. 0.825," remarks that "any of the summary processes of rectification which are practised by distillers in the manufacture of alcoholic spirits, are applicable to the separation of benzole from the less volatile fluids of naphtha;" and, appended to his scientific treatise on coal-tar, under the title "*Of a Practical Mode of preparing Benzole*," goes on to describe a process for that purpose, which, I believe, he had previously patented. It appears that Mansfield did not employ this process in his research, but obtained his benzole, as well as the other less volatile hydrocarbons, in the usual manner,—by simple distillation.

In the belief that no process of fractioning at all analogous to mine has ever been employed in scientific research, and that I am not in any way directly indebted to any of the devices of my predecessors, I have taken no special pains to consider these devices in much detail. I may say, however, that I have found no record of any one's ever having employed the oil bath and a separate fire to regulate a heated condenser, this being the essential feature on which the superiority of my process is based; adapting it at once to both high and low temperatures, and for the most delicate work.

The employment of bulbs, above referred to, as proposed by Wurtz, is simply a modification of the old process. The bulb apparatus furnishes the same, or, at most, but slightly better results than a simple retort; being no more than equivalent to increasing the height of the sides of the retort itself, without introducing any control over the accuracy of the results; the only advantage gained being, that these results are obtained somewhat more quickly.

perature of which is regulated by means of a separate lamp, *b*, fig. 2, or by a safety-furnace, *p*, as shown in fig. 1. The bath may be of oil or water, or of metal for very high temperatures, as the case may require, and is furnished with a thermometer, *t*.

1

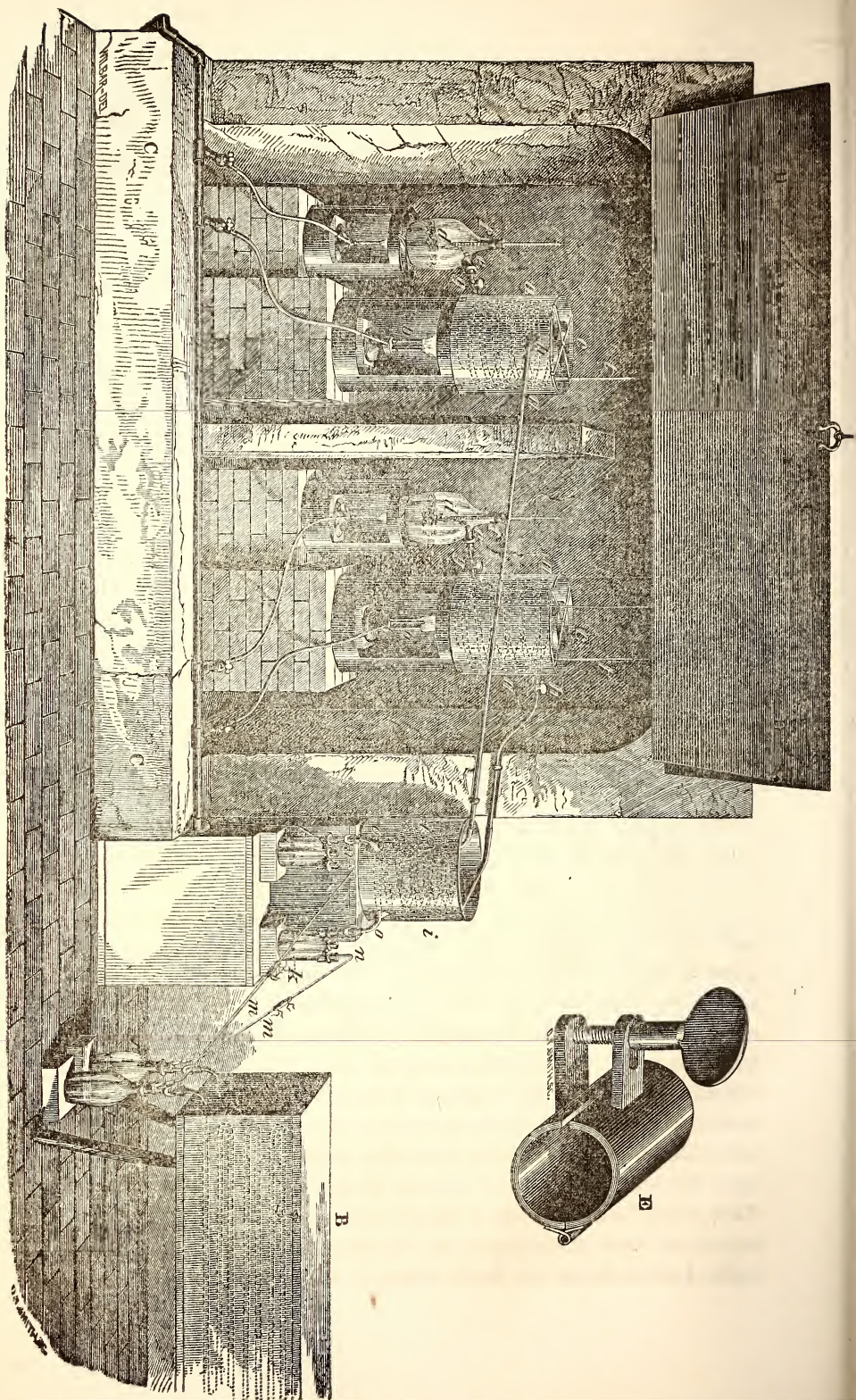


That this bath may be equally adapted for the separation of liquids boiling below the common temperature, an empty vessel, *c*, figs. 1 and 2, is permanently secured in the interior of the bath by means of straps of metal across the top, to serve as a convenient receptacle for ice or iced water, by means of which a low temperature may be steadily maintained. The interior vessel also serves a good purpose in economizing time, and fuel in heating the bath, as it diminishes the quantity of oil required to cover the worm. It is made to extend to within about three inches of the bottom of the bath, and large enough to fill the greater part of the space in the centre of the coil. The bath and interior vessel are both made of sheet-copper, with joints

brazed so that they will bear a high temperature. I generally use, also, copper worms, especially in the earlier distillations, the quantities then operated upon being larger, as such worms are conveniently procured, and not liable to break. In the larger-sized apparatus, the tube of which the worm is made measures ten feet in length and half an inch in diameter. I have tried several lengths of worm and several diameters of tube, but not, as yet, with any special view of determining the precise proportions, in relation to the size of the retort, which would be best adapted to the purpose. There appears, however, to be nothing gained by increasing the length of the worm beyond what is required to reduce the temperature of the vapors to that of the bath. I have in use three sizes of apparatus: the largest has a copper worm 10 feet long and  $\frac{1}{2}$  inch bore; the medium size, a worm 5 feet long and  $\frac{3}{8}$  inch bore; and the smallest size, for very small quantities, a worm 1 foot 6 inches long and  $\frac{1}{4}$  inch bore. Each of these has been found to answer a good purpose. The distillation may be conducted in a glass flask, or more conveniently in a glass retort of the form shown at *d*, figs. 1 and 2. The body of this retort, as appears in the figure, is of the form of the corresponding part of the common retort; but which, in place of a long neck, has only a short tubulure, *e*, in the side, for escape of the vapors, and another tubulure, *f*, in the top, which contains the thermometer, and through which the retort is charged.

In the larger apparatus the retort is connected with the lower end of the elevated worm by means of a glass tube of about the same diameter as the end of the worm. One end of this tube enters the retort at the lateral tubulure through a perforated cork, and the other end is joined to the end of the worm, either by being firmly bound with a strip of cloth thickly covered with vulcanized caoutchouc,—such as is found in commerce,—or by means of a perforated cork, which is made to fit the ends of both tubes as snugly as possible, and then tightly pressed together upon the joint by means of an iron clamp, as shown at *g*, fig. 2. This clamp is figured on a larger scale at *E*. As it is highly important that all joints in the apparatus should be perfectly tight, inasmuch as the least leakage, when continued a long





time, would cause, in the aggregate, a serious loss of material, I would call special attention to the clamp joint as the best which I have tried. Before falling upon this device I had used exclusively the vulcanized caoutchouc joints, which were found to answer a good purpose, in most cases, except that they required too frequent renewal. I have found the cloth covered with vulcanized caoutchouc preferable to the common caoutchouc tubing. In the smaller sizes of apparatus I have the end of the worm itself project far enough from the bath to connect directly with the retort by means of a perforated cork, without the use of an additional connecting tube.

The upper end, *h*, of the elevated worm is brought out through the side of the bath at a point about three inches below the top; so that, when working with a low temperature of the bath, the worm may still be completely covered with oil, and also give sufficient space above the worm for the expansion of the oil when higher temperatures are employed. To avoid contaminating the atmosphere of the laboratory with the disagreeable fumes which are given off, in large quantity, from such a mass of heated oil, the top of the bath is tightly closed with a sheet-iron cover, from which a small funnel, *A*, fig. 1, conducts these fumes to a chimney.

In the larger apparatus, the vapors which succeed in passing through the heated worm are conducted downward into a cooled worm contained in a bath of water, *ii*, fig. 2, and the liquid product is collected in the receiver, *k*. The cold bath, *ii*, contains two condensing worms,—one for each apparatus,—and is large enough to condense for both without the necessity of renewing the water. I have represented two apparatuses combined, as it will be found more economical of time to operate with two at once. In the smaller apparatus, for the table, a Liebig condenser may be conveniently substituted for the cold worm, as shown in fig. 1.

For collecting liquids which boil below the common temperature, when such are present, I attach a refrigerator, *B*, fig. 2, which is provided with two block-tin condensing-tubes,—one for each apparatus. These are bent in a zigzag form, and attached to the inner sides of the refrigerator. The lower ends of the



tubes extend through the end of the refrigerator far enough to form a convenient connection with the second receiver, *l*, fig. 2, which communicates with the first receiver, *k*, by means of the glass tube, *m*.

In order to successfully collect and condense the vapors of such extremely volatile liquids as are now under consideration, it is of course indispensable that the apparatus should be constructed with very tight joints; and for greater convenience, but more especially to prevent breakage, such of the joints as require to be frequently taken apart should be made flexible. A very convenient and perfectly tight joint of this kind may be made as follows:—the short stationary tube, *n*, in the cork of the receiver, *k*, fig. 2, is made with the opening somewhat divergent upward; the end, *o*, of the worm is enough smaller than the inside diameter of the upper end of the tube, *n*, to leave room for a piece of caoutchouc tube to be drawn over it, and still admit of its being inserted in the end of the tube, *n*; the flexible tube is drawn on far enough to prevent the drops which form on the end of the worm from coming in contact with the caoutchouc; a perfectly tight and convenient flexible joint is now made by pressing the tube, *n*, over the caoutchouc covering of the end of the worm, *o*. The joints of the receivers, *ll*, are made in the same manner.

The vapors which escape condensation in *ii* pass through the receivers, *kk* and *ll*, to the refrigerator, *B*, which contains ice, or a mixture of ice and salt, are there condensed and fall back into the receivers, *ll*; which should stand in a wooden vessel also containing ice or a freezing mixture. The refrigerator, *B*, is made with double bottom and sides, with an inch space between, which is filled with pulverized charcoal. Being tightly covered, a charge of ice and salt will serve for a long day's operations without renewal. In this manner I have been able to collect, in considerable quantity, bodies boiled nearly at 0° C., and this from mixtures in which such bodies had been quite overlooked by previous investigators.

It will be observed in reference to fig. 2, that the larger distilling apparatus is represented as standing in a brick fire-place, with brick-work *CC*, a few inches high, built up in front; and

a sheet-iron apron, DD, folded above. This is for security against fire in case of accident, either to the retort or hot bath of oil. As arranged, the contents of either or both of these could run out and burn without danger to the operator or the premises, as the brick-work in front would prevent the liquid from spreading beyond the fire-place, and the dropping of the sheet-iron apron would cause an additional draft, and thus insure the passage of the flames into the chimney. Instead of placing the apparatus in a fire-place, where that is not convenient, equal security against accidents may be attained by the use of my safety heating lamp,\* *q*, fig. 1, to heat the retort, and safety-furnace, *p*, containing a Bensen's burner, for heating the bath. The bottom of this furnace, and also a large part of the sides, is formed of wire gauze, such as described for the safety-lamp.† The gauze upon the bottom need not be permanently attached to the furnace, but may simply be laid upon an opening cut in the stool or board on which the furnace is to be placed; if the furnace be then set upon it, taking care that the joint shall be tight around the edge, nothing more will be required. A strip of vulcanized caoutchouc, about an eighth of an inch in thickness, is riveted around the edge of the opening for the door; against this the door tightly closes, so that no ignition can take place through the cracks which would otherwise remain under the edges of the door.

For an apparatus to stand upon the table, the safety-lamp and furnace are especially desirable. I have also used them for the larger apparatus, placed upon the floor of the laboratory. As a practical test of the security which they afford, I may relate an incident which happened to myself. I had left the laboratory for a short time, with such an apparatus in full operation; the retort containing nearly a quart of light petroleum boiling below 100° C. Having been detained longer than I expected, on returning I found the laboratory filled with the vapors of hydrocarbons; and, on approaching the retort, found that the caoutchouc joint, connecting the retort with the elevated worm, had failed, and that the larger portion of the liquid had distilled into

\* American Journal of Science and Arts, May, 1862 [2,] xxxiii, 275.

† Loc. cit. See Amer. Jour. Pharm. xxxiv. 217.



the room, having been mainly condensed in the upper worm, and conducted thence down the outside of the retort into the safety-lamp. This process was still going on, the lamp being highly-heated from the excess of fuel thus added to it, but no ignition took place outside the lamp. Although this experiment was rather injudicious, it furnishes a valuable test of the efficiency of the safety-lamp and furnace.

Having described the apparatus, I now proceed to give such details of the method of conducting the separations as have been found, in my experience, most efficient and economical of time. In commencing with a crude mixture of unknown liquids, I deem it advisable to operate at once on a tolerable large quantity of material, especially if the constituents are supposed to be numerous, and to omit chemical treatment till after the separations have so far progressed as to indicate the number and species of bodies present, and, approximately, their several boiling-points.

Notwithstanding the precautions taken to avoid loss from evaporation and leakage, I have at times been surprised at the large waste of material which has been made apparent after a long series of operations. When it is considered, however, that the time required to make a complete separation of a very complex mixture of liquids must necessarily be very protracted, during which more or less of evaporation is constantly taking place, it will be a matter of no surprise that the loss is so considerable. The quantity of material required must depend also on the proportions in which the various constituents are contained in the crude mixture, and upon their degree of volatility; but as these cannot be known *a priori*, it may suffice to make a single preliminary distillation of a portion of the mixture, from a tubulated retort, to ascertain the range of temperature within which it distills, noting at the same time the proportions which come over between certain temperatures; as, for example, below  $50^{\circ}$  C.; between  $50^{\circ}$  and  $100^{\circ}$ , etc.; from these data one may judge pretty nearly of the quantity which it will be advisable to take. It is evident that, when very volatile bodies are present, even in considerable proportion, a much larger quantity would be required than if the material were but slightly volatile a the

waste in the former case, from evaporation, would be much greater.

But in many cases it will be found that highly volatile bodies are present only in very small proportion,—e. g., in viscid petroleum like Rangoon tar, and in the products of distillation of some species of asphalt. In such cases, the requisite quantity to be operated upon, to obtain the most volatile constituents in sufficient quantity for anything like a complete study of their chemical relations, would be extremely large,—too large to be conducted in the laboratory,—and one would have to resort to the manufactory for the first distillation. I have dwelt at some length on this point, having experienced the disappointment which one feels, after months of labor, on finding the products insufficient for his requirements. when the expenditure of a little more time, comparatively, might have given double the quantities obtained.

In the first series of fractioning, I generally operate on successive portions, of about one gallon each, of the crude material, and take off a fraction for every  $20^{\circ}$  C. rise of temperature of the retort. These fractions are preserved in well-stoppered bottles, and each carefully labelled with the temperatures between which it was obtained. The fractions for each fresh portion of the crude material, being collected between the same limits of temperature, are added to the corresponding products from the preceding operations, till enough of the crude material has been taken to insure, ultimately, a sufficiency of the pure products.

In the commencement, not only of this but of all subsequent fractionings, when the temperature to which the bath should be raised is unknown, I first bring the liquid in the retort into full ebullition, so that a steady stream of liquid shall flow back from the end of the worm into the retort. I then carefully raise the temperature of the bath until the vapors from the retort pass through the heated worm so freely that the liquid, in condensing from them, shall drop with tolerable rapidity into the cold receiver. In order that this dropping may be continuous, it is necessary that the temperature of the bath should rise *very gradually* as the more volatile constituents of the mixture are taken off; this is easily effected by carefully regulating the flame under the bath.

It is advisable to boil the retort as rapidly as possible without choking the lower end of the heated worm with the returning liquid. As this choking would give rise to additional pressure in the retort, and consequently occasion abnormal elevation of the temperature, and possibly a rush of liquid into the receiver, and thus introduce irregularities in the work, excessive heat under the retort should be avoided. The first indication of choking of the worm is a partial or entire stoppage of the stream of liquid which normally flows steadily from the end of the worm into the retort. Any interruption or unsteadiness of this flow would indicate too rapid ebullition.

As a rule, other things being equal, the greater the difference between the temperature of the bath and that of the retort, the slower the products will come off, and the more effectual will be the separation. I think it possible, however, that the earlier fractionings may be conducted so slowly that the loss of time would more than counterbalance what might be gained by more thorough separation, and that equally good results may be more economically obtained by more frequent operations, somewhat more rapidly conducted.

A striking illustration of the advantage to be gained by this process is presented by the fact that, during the first fractioning of a crude mixture, such as American petroleum or coal-tar naphtha, for example, the difference between the temperature of the bath and that of the retort may sometimes be as much as 35° C., or even more. While, as the products become purer, this difference between the temperatures of the bath and retort proportionally decreases, till finally, in operating on a pure product, the temperature of the bath must be brought to within a few degrees of that of the retort, in order to bring the vapors through. But the amount of this difference is variable for different bodies of equal purity.

The first fractionings must necessarily be quite arbitrary; for, as a general rule, when operating on such mixtures as those just mentioned, neither the thermometer nor the quantities obtained for any given range of temperature will indicate any decided preponderance of any one substance. On the contrary, the temperature rises uniformly, and about the same quantity is

generally obtained for the same number of degrees of temperature throughout the operation. In other mixtures, in which certain bodies may seem to be present in much larger proportion than others, or in which there may be a greater difference between the boiling-points of the constituents than in the cases referred to,—facts which would be indicated by the thermometer of the retort, and by the relative quantities of the products obtained,—there might be something gained by exercising discretion in taking off fractions according to these indications.

In the second series of fractioning, the first or lowest fraction of the preceding series, which is large enough to operate upon by itself, is transferred to the retort, and brought into ebullition. The temperature of the bath is then adjusted as above described, and the distillation continued, the fractions obtained being placed in their appropriate bottles until the temperature of the retort shall have risen to, or somewhat above, the point at which the second or next succeeding fraction of the first series may be supposed, or has been found by experiment, to boil. This fraction is then added to the residue in the retort, and the distillation is continued as before. In the same manner, I proceed with the remaining fractions of the first series.

All subsequent fractions are similarly conducted. As the work progresses, however, the fractions are taken for a gradually decreasing number of degrees of temperature, until finally it becomes necessary, for the attainment of absolute constancy of boiling-point, to take off a fraction of every degree, centigrade; and to continue thus to operate on these fractions, each representing one degree of temperature, until the desired end is attained.

The operator will observe that, in each series of fractions, in which each fraction has been taken for the same range of temperature, the difference between the boiling-points of any two contiguous fractions is nearly the same as the difference between any other two contiguous fractions,—in other words, that the difference referred to approximates to a common difference throughout the same series. Once ascertained, this difference serves as a valuable guide in determining with sufficient ac-



curacy when to add the next fraction to the retort. By observing this systematic course, irregularities, from the improper mixture of products, may be avoided, and time thus economized.

After a few series of fractionings,—sometimes after two or three, variable in number, according to the nature or complication of the mixture,—it will be found that some of the fractions are considerably larger than others for the same range of temperature, indicating approximately the boiling-points of the several constituents. But fractions of constant boiling-point, or those the boiling-points of which cannot be sensibly changed by further fractional condensation, are not obtained, as already mentioned, till after repeated careful fractioning of every degree of temperature. When fractioning of every degree, it is important to use every precaution to protect the thermometer from external influences, and to carefully apply the corrections for variations in the atmospheric pressure. This may even be desirable earlier; but it is of so much importance in the case specified, that, if omitted, the operator would be liable one day to mix products which he had separated the day previous.

In this way, certain larger fractions are obtained, which are not susceptible of further alteration in their boiling-points; but there are yet considerable quantities of liquid in the intermediate fractions, which still continue to change more or less in each succeeding operation. When the fractions of constant boiling-point have once been obtained, if it were not important to test for other bodies in the intermediate fractions, the operation might here be suspended, provided the pure products already obtained should be large enough for the purposes required.

But, in my investigations, I have undertaken to prove the negative as well as the positive. I have attempted to carry the process of separation so far, that I might assert the absence of other bodies, as well as the presence of those obtained; and this clearing up of the intermediate fractions has generally been the most tedious part of the work. I have continued to operate upon these by themselves, until they almost have become distributed in regular course—no new bodies appearing—among the fractions of constant boiling point, or to such an extent that the intermediate

quantities have become too small to admit of further continuance of the process.

This process has been in constant use in my laboratory during the last three years. In this time it has been applied in the study of petroleums, coal oils, the more volatile parts of coal- and wood-tars, the essential oil of cumin, commercial fusel oil, from corn whiskey, and even to mixtures more complex than either of these. As the result of this long experience, I can say that, as regards bodies not decomposed by heat in distillation, I have not yet found a mixture so complex that it may not be resolved by this process into its proximate constituents so completely, that these shall have almost absolutely constant boiling-points. In repeated instances, even from petroleums, I have obtained these constituents so pure, that the contents of an ordinary tubulated retort charged with one of them has been comparatively distilled off without any essential change of temperature; i. e., not to the amount of  $\frac{1}{2}^{\circ}$  C., the thermometer frequently remaining absolutely constant for more than half an hour, a constancy of boiling-point not exceeded by that of distilled water. This state of purity, I think I may safely assert, has never before been attained from such mixtures, by any system of fractional distillation.

As I soon shall be prepared to present to the Academy detailed results of the investigations above referred to, I may omit further allusion to them on this occasion.

I would remark, in conclusion, that it seems to me not improbable that this process may ultimately prove to be of great value in the arts. It is not too much to anticipate that, whenever the various constituents of the mixtures referred to shall have been separately and thoroughly studied in a pure state, some of them may be found to possess properties which will give to them great commercial value, sufficient to justify the expenditure necessary to separate them in large quantities.

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#### METALLIC TUNGSTEN.

We learn that a Swedish metallurgist has discovered a method of reducing tungsten, by which he obtains it at once in a state of

fusion, and that ingots of the pure metal, weighing several pounds each, are now on exhibition at Stockholm. We are informed, too, that the cost of obtaining tungsten by the new method does not exceed a few shillings per pound. If really obtainable thus cheaply, a metal which will bear exposure to so intense a heat, without undergoing either fusion or oxidation, must prove of incalculable value to certain of the arts, provided that the difficulties in the way of working it are not insuperable. With the exception of gold and platinum, tungsten is the heaviest metal yet known. Its specific gravity is about 18, that of gold being 19.36, and that of platinum 21.53.—*London Chem. News*, August 25, 1865, from *Mechanics' Magazine*.

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#### THEBOLACTIC ACID.

BY MESSRS. T. AND H. SMITH.

As it has been remarked that we have never published the process for obtaining Thebolactic Acid, may we take the liberty of submitting to you the process here embodied, which at the first we printed, circulated, and supplied to the jurors of the International Exhibition of 1862, when the thebolactic acid was first publicly exhibited? We feel called upon to take this step by seeing in the "Dictionary of Chemistry" (by Watts), now publishing Thebolactic Acid (under the head "Opium") classed as one of the doubtful constituents of Opium; and Dr. Thomas Anderson, Professor of Chemistry, made responsible for that doubtful character. In a paper read by Dr. Anderson at the Chemical Society on the 1st May, 1862, and published in the journal of the Chemical Society, thebolactic acid is ranked as one of the "well-determined" constituents of opium; and in a letter we just have from him, he says, "I have never entertained any doubt as to your having extracted from it (opium) an acid which Stenhouse found to have the same composition as lactic acid."

The ready crystallizability of the salt of lime gives the means of obtaining the thebolactic acid from opium.

After all the alkaloids have been thrown down by an alkali from the impure mother-liquids of morphia, the concentrated

liquid is digested with levigated litharge at a heat of about 140° Fahr., with frequent stirring.

The thinned and filtered liquid, having been then concentrated to a thick consistency, is mixed up with a large quantity of S. V. R. From the filtered spirituous liquid the bases are carefully thrown down as sulphates by the addition of sulphuric acid (of which, to do this, a large quantity is necessary). The filtered liquid, after careful neutralization with milk of lime, is distilled to recover the spirit.

On the contents of the still being then brought to a syrupy consistence, and laid aside for a week or so, the syrupy liquid sets into a crystalline mass of thebolactate of lime.

Having obtained the lime salt, it is easily purified by repeated crystallization and the use of charcoal. After bringing the salt to a snowy whiteness, the acid can then, by the addition of the equivalent quantity of sulphuric acid and the use of S. V. R., or other obvious means, be obtained in a separate state.

From the unvarying occurrence of this acid in opium, and its abundance, there cannot be any more doubt of its pre-existence there than of meconic acid, codeia, thebia, or morphia itself. Since its discovery, the general yield from Turkey opium of the thebolactate of lime has been about two per cent.

The circumstance of the quantity of meconic acid obtained from opium being decidedly less than corresponds to the morphia and other organic bases, is a strong argument in itself for the pre-existence of thebolactic acid, and from this conviction arose the search for, and discovery of, this new acid in opium.

Though we have some reason to think Mr. Watts rather loose, our object here is not to complain, but to draw attention to an interesting matter.

Our belief that thebolactic acid exists as a constituent ingredient of opium is founded on the fact that it was separated from at least twenty different consignments of opium of different seasons, and that the yield was uniform, and, as nearly as could be judged, invariable in quantity. Altogether, we prepared about one hundredweight of thebolactate of lime, most of which we purified to a snowy whiteness.

Dr. Anderson, in his present letter to us, says—"I think fur-



ther evidence is required to show that thebolactic acid is really isomeric, and not identical, with lactic acid. So far as I recollect, Stenhouse merely determined the constitution of the acid, and did not make such a comparison of its salts with those of the ordinary lactic as seems necessary to establish this point in a thoroughly satisfactory manner. We now know two kinds of that acid, the common variety, and sarcolactic acid; and if you clearly showed that thebolactic acid is a third, it would be a matter of the greatest interest, and would well repay the labor it requires."

While Mr. Watts, in his Dictionary, says—"Anderson was not able to detect the existence of thebolactic acid in opium." Anderson says—"In my investigations of opium, I have not *attempted* to prepare thebolactic acid, but have confined my attention entirely to the basic constituents of opium."

We could not object to any one doubting that thebolactic acid was not the result of change in the juice of the poppy, after exudation or during manipulation, in the manufacture of morphia and other principles, any more than we could object to such a view in regard to meconic acid; but we think that, until the natural existence originally of these acids is disproved, it is fair to hold them as "*well-determined*" constituents. We would feel obliged to any one throwing more light on the matter, even if they proved the non-existence, naturally or originally, of thebolactic acid in opium.—*London Pharm. Journ.*, August 1, 1865.

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#### MANUFACTURE OF SODA FROM CRYOLITE IN AMERICA.

To the Editor of the *Chemical News*.

SIR,—How comes it that the English soda ash manufacturers have allowed the Americans to steal a march on them in the matter of cryolite? A company here have secured, so I understand, the monopoly of all the cryolite mined in Greenland, except that used in Denmark, for the purpose of the manufacture of soda ash. Extensive works are going on up near Pittsburg, in this State. The process used is the Danish—*i.e.*, boiling in lime and precipitating the  $\text{Al}_2\text{O}_3$  by  $\text{CO}_2$ . My informant is one of the capitalists of the company.

I think if the cryolite can be obtained in sufficient quantity, the importation of soda ash and caustic soda into this country is at an end, or rather will be. I fancied our manufacturers were pretty smart fellows, but they have let the Yankees get ahead of them in this case. All English manufacturers must look well to themselves, as the Americans are following very close at their heels, in some cases, tripping them up,

I am, &c. H. B.

Philadelphia, U. S., August 30.

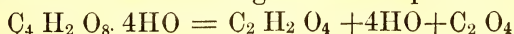
*London Chem. News*, September 22, 1865.

THE RECIPROCAL ACTION OF GLYCERIN AND OXALIC ACID, APPLICATION TO THE INDUSTRIAL PREPARATION OF CONCENTRATED AND MONOHYDRATED FORMIC ACID.

BY M. LORIN.\*

Formic acid may be obtained by the splitting up of oxalic acid under the influence of glycerin. The preparation by this reaction is regular, provided water be added to the mixture so as to determine the separation of the dissolved formic acid, which is retained to about 200°, and finally decomposes into water and carbonic oxide. Procured in this way, the acid contains from 4 to 5 per cent. of real formic acid.

*I. Industrial Preparation of Formic Acid at 50 Centiemes.*—The mixture of ordinary oxalic acid with dehydrated or commercial glycerin is heated in a retort. At 75° the reaction will commence, and will be in full activity at 90°. Simultaneously with the disengagement of carbonic acid, an aqueous liquid passes, charged with formic acid. By the addition of a fresh quantity of oxalic acid—added some time after the carbonic acid has ceased to be disengaged—the decomposition immediately recommences; a liquid again passes still richer in formic acid; and by successive additions of oxalic acid, the richness in formic acid, of the liquid obtained during this series of reactions, is always on the increase, until it reaches a limit which is precisely that which crystallised oxalic acid should give. The equation—



\**Comptes Rendus*, lxi., 382.

shows that 126 grammes of oxalic acid furnish 82 grammes of aqueous formic acid, which ought to contain, and, in fact, does contain, 56 per cent. of true formic acid. The existence of this limit is the result of the repeated and successive combination of the formic acid, held back by the glycerin, with this polyatomic alcohol,—a combination rendered especially evident by the fact that the quantity of water eliminated from the glycerin is equivalent to the quantity of formic acid fixed in each of the successive phases of the reaction.

In one series of experiments the aqueous formic acid from each kilogramme of oxalic acid, added in portions of 250 grammes, titrated 24, 44, 53; in a second series, 17, 33, 41, 46, 50, and 51.5; the standard was raised more rapidly at the commencement of the operation. The excess of water, shown by these experiments to exist in the first products, appears, then, to be the result of the formation of a compound of glycerin and formic acid, the acid being regularly produced only after this compound has ceased to be formed. The limit of saturation has been found to correspond to 70 centiemes of the quantity of formic acid which would have been necessary to saturate the glycerin, giving a monoformine.

This method of preparing formic acid of 56 per cent. is so continuous and regular that it is one of the easiest of chemical operations. No attention need be paid to the temperature, the disengagement of carbonic acid forming the initial and final phases of the operation. Starting with 1 kilogramme of glycerin, and by successively adding 250 grammes of oxalic acid, we obtain, for each kilogramme of acid added at one time, 650 grammes of formic acid at 56 per cent. It is moreover evident that under these conditions an equal weight of formic acid at 25 per cent. costs no more than the oxalic acid which has served to produce it; for by the addition of water, forming a litre of each quantity of formic acid collected in the second series of experiments, I obtained the standards 21, 26, 31, 33, 34. The glycerine being saturated, 1 kilogramme of oxalic acid furnished 1.5 kilog. of formic acid, at 25. The operation may be prolonged to any extent, and if after being used a long time it is found necessary to change the glycerin, it will be on account of the impossibility

of avoiding the almost imperceptible losses, and of the presence of impurities in the oxalic acid. I have, however, used the same glycerin for several months, the operations continuing incessantly night and day.

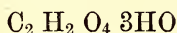
*II. Formic Acid at 75 Centiemes.*—By making dehydrated oxalic acid act on saturated glycerin, I obtain formic acid at an average standard of 75. The heat, however, requires very careful management to avoid frothing. The decomposition of oxalic acid commences at  $50^{\circ}$ .

*III. Monohydrated and Crystallisable Formic Acid.*—Monohydrated formic acid has hitherto been obtained by decomposing formiate of lead by sulphuretted hydrogen, a long and difficult operation, which in unpractised hands is rarely successful. I have, in the first place, substituted formiate of copper, comparatively a very soluble salt, for formiate of lead, it being more easily crystallised, dehydrated, and decomposed by sulphuretted hydrogen, and giving the theoretical quantity of formic acid. This is probably not the only case in which salt of copper would be preferable to salt of lead for the preparation of organic acids. It occurred to me, however, that the 25 per cent. of water might be eliminated from the 75 per cent. acid by the use of anhydrous oxalic acid. On making this acid react at  $70^{\circ}$  on formic acid, the temperature rises, the mixture becomes liquid when carefully heated, and when left to stand it crystallises; by decanting and distilling to separate the dissolved oxalic acid, formic acid, at a standard of about 100, is obtained, which, by a proper lowering of the temperature, gives crystallisable formic acid.

*IV. Various Experiments.*—In the course of these researches I have observed the following facts:—1. That of all the formiates, formiate of copper alone when decomposed by heat, gives formic acid of only a certain degree of concentration—82. 2. Whatever precautions I have taken, I have rarely obtained acids at 70 by the action of sulphuric acid on formiates, and those always in relatively small quantities. With biformiate I have been not more successful. 3. The splitting up of ordinary or dehydrated oxalic acid under the influence of acetic and formic acids, may be utilised in the preparation of formic acid. 4. Dehydrated oxalic acid, submitted to the moderate action of heat, furnished in one



experiment a considerable quantity of formic acid at 55°. 5. From a theoretical point of view the use of sulphuric acid as an absorbent of aqueous vapor, is of some interest. I have operated on formic acid at 57·5 in the months of November and December, at the ordinary temperature of the laboratory; by once in every three days weighing and taking the standard, always at the same hour, I was enabled carefully to follow the phenomenon. Water is always absorbed more rapidly than the acid, and the standard rises to 63; the relation between the acid and water converges, and remains at about the limit 1·7. This relation, which differs a little from  $\frac{46}{27} = 1\cdot704$ , seems to indicate, under these conditions, the existence of a hydrate of formic acid, corresponding to the formula—



Renewing the boiled sulphuric does not sensibly alter this relation. 6. The easier preparation of formamide, and especially that of pure carbonic oxide by formic and sulphuric acids, is another result of these researches.—*London Chemical News*, Sept. 29, 1865.

#### OXYGENATED SALINE WATERS.

BY B. W. RICHARDSON, M. A., M. D., LONDON.

Dr. Richardson laid before the British Medical Association specimens of oxygenated saline waters. In these solutions he had succeeded in combining peroxide of hydrogen (containing ten volumes of active oxygen) with various saline substances, and especially with salts of iron. The waters, when properly diluted, were almost tasteless, the taste being so unobjectionable that children could take them, and adults could drink them at meals in place of common water or other fluid. The solutions presented were a diuretic water, carrying nitrate of potassa, and spirit of nitric ether; a simple aperient water, conveying sulphate of potassa; and two chalybeate saline waters, one containing phosphate, the other persulphate, of iron, with a little free oxide of iron. The waters were all mildly aperient. They were used for adults in proportions of two ounces for a dose, ordinary water being added, so as to fill a tumbler. Specimens were diluted in this way, and handed to the members. Dr.

Richardson said that the water containing the persulphate of iron was the best chalybeate aperient he had ever used. It remained fresh for weeks, and in appearance resembled to perfection a natural mineral chalybeate water. It differed, however, from such water, in that it contained a little sugar and was rich in oxygen. Each dose contained a grain of the iron salt. The formula for this water was as follows:—

Peroxide of hydrogen	.	3i.
(Ten volumes of oxygen,)		
Sulphate of potassa	.	3ij.
Chloride of sodium	.	3iss.
Sulphate of iron	.	grs. xij.
Simple syrup	.	3i.
Water to	.	3xxiv.

Dose: Two fluidounces to be taken with as much water as will fill a tumbler.

In obstinate cases of constipation with anæmia, and in cases of asthenic gout, this solution was most useful. The advantages derived from the peroxide of hydrogen in these waters were most important, the peroxide quickening the eliminative action, and producing free secretion and excretion.

In reply to a question as to the manufacture of these waters, Dr. Richardson said that any practitioners, who had the peroxide of hydrogen, could make the waters for themselves, but they were very efficiently made by Messrs. Garden and Robbins, of Oxford street, London.—*London Chem. News*, September 15, 1865.

#### ABSTRACT OF A REPORT ON THE PITAYO CINCHONAS.

By MR. ROBERT CROSS.

Mr. Clements R. Markham having been impressed with the importance of procuring seeds of the species of *Cinchona* which grow at and near Pitayo, New Granada, obtained the sanction of the Secretary for India to employ Mr. Cross in the service. Mr. Cross remarks that most persons who have written on the *Cinchona* of the Andes represent it as flourishing amidst perpetual torrents of rain and mist, and scarcely ever enjoying a moment of sunshine. He states that this is a mistake. No *Cinchona*

could live in such a climate, nor, even if planted in similar situations, could the trees ripen their seeds, for a certain amount of dry weather and sunshine is necessary for the ripening of the capsules, and for their bursting in order that the seeds may fall to the earth. The Cinchona climate is certainly moist for about six or eight months of the year, and in cultivating this plant it is expedient to seek very humid situations, because the mountains of India do not appear to receive the same amount of moisture as the lofty elevations in America. Nevertheless it will be understood that the natural climate of the commercial Cinchona has been misrepresented by most South American travellers. The Pitayo Cinchona differs essentially from the *C. lancifolia* of Karsten in being a more slender tree, often found formerly from 60 to 70 feet in height, but rarely more than 18 inches or 2 feet in diameter, with very slender branches, bearing small lanceolate leaves, which before falling always assume a purple or deep red color. The *C. lancifolia* to which Karsten refers extends over a wider tract of country than any other Cinchona on the Andes. This tree, however, is much more massive, and bears considerably larger leaves than those of the Pitayo Cinchona. This large-leaved Cinchona inhabits the western slopes of the Cordillera Orientale, in situations presenting conditions favorable for its development, between Pasto and the city of Santa Fé de Bogota; while the finer kinds of Pitayo bark are limited to a few square miles of steep forest-covered slopes to the northward of the volcano Purace, which belongs properly to the central Cordillera. The map of the Cinchona region of New Granada lately made for Dr. Weddel, is very incorrect. It represents certain tracts of country as mountainous, and as covered with Cinchona forests, while in reality they are hot arenaceous plants, or savannas covered with low spreading leguminous trees, where no Cinchona ever grew. Karsten states that the bark is not taken from the roots of the *C. lancifolia*, which, in most instances, is true; but this is not the case with that of Pitayo, the bark from the roots of which is much more valuable than that from the trunks or branches. Further he asserts that the *C. lancifolia* is never likely to become scarce, and that the continual cutting of the Cinchona trees will rather augment than diminish the number of plants; and this

may be true concerning his *C. lancifolia*, about which no one cares much, as the yield of quinine is often too small to cover the expense of collecting; but as regards the Pitayo bark there is one thing very certain, that at the present time there is more difficulty in collecting 1 lb. than there was formerly in collecting 1 cwt. The Pitayo bark will very probably be found the best of all the species for cultivation, as it is said to grow very rapidly, which is a matter of great importance. It may certainly be barked when it is 6 feet high, although it would not be an advisable practice to do so before the trees are at least 30 feet high. Bark taken from large trees in Pitayo was said to give nearly 4 per cent., while bark taken from the roots of the same trees gave 5 per cent. of quinine. All the bark taken from Pitayo is said to be sent to France. The bark sold in England under that name is not true Pitayo bark, but comes from the mountains which border on the valley of the Magdalena, and from Almaquer and Pasto, and is certainly from the *C. lancifolia* of Karsten, which as regards quality is very inferior to that of Pitayo. True Pitayo bark may be known in England by not being much thicker than common window-glass—because it is all taken from small plants, the large trees having been destroyed long ago, and by its being full of earthy particles, on account of so much bark being taken from the roots of the plants. Professor Jamieson, of Quito, analysed the Pitayo bark, and found it to contain 3.2 per cent. of quinine. There is, therefore, little doubt that this species, and the *Cinchona officinalis* of Loxa, will prove among the best for cultivation. The climate is like that of Loxa, and even the vegetation of both regions bears a close resemblance to each other. Don Narco Lorenzano remarks that the principal motive which induced the Government of India to commence *Cinchona* cultivation, after overcoming so many difficulties, was the fear that the Quina trees would be extirpated in consequence of the waste that is allowed in the woods, where they are destroyed by the barbarous method of pulling up the roots. Fortunately this destructive method, which, without any doubt, would extirpate this precious plant in a few years, is only practised in the forests of Pitayo, where it is due to the immoderate desire for making money which has taken possession of the Indians, who own the



greater part of the land. But in none of the other establishments for the collection of bark in New Granada has a similar practice been adopted. On the contrary, beneficial rules are observed for the conservancy of the woods. The method consists in leaving a part of the trunk, about 3 feet in height, whence shoots may sprout, and in clearing away the surrounding trees to enable the rays of the sun to penetrate. By this means most of the trees that are cut down quickly shoot up, and, the rays of the sun penetrating to the cleared ground, the seeds which fall from the trees germinate freely. This result gives us full confidence that the good kinds of quinas which exist in this country will be permanently preserved.—*London Pharm. Journ.*, Sept. 1, 1865, from *Gardeners' Chronicle*.

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#### ON THE POSSIBILITY OF MANUFACTURING NÉROLI IN THE BRITISH COLONIES.\*

BY J. E. DE VRIJ.

When on my way to Java in the month of October, 1857, I passed through the South of France, my attention was fixed by the large number of orange trees cultivated in the neighborhood of Cannes, Grasse, &c., for the purpose of manufacturing néroli, which fragrant essence is exported from the southern parts of France, and from Italy, to England and other northern countries. The high price of this essence induced me to inquire if it would not be possible to manufacture it in the colony where I was going to reside for some years.

A few months after my arrival in Java I fortunately had the opportunity of putting my idea into practice. In Bandoug, the town where I lived, which is situate at an elevation of about 2300 feet above the level of the sea, I was struck in the months of October and November by the fragrant smell of orange flowers, which perfumed the whole neighborhood. Upon inquiring the cause, I found there existed in that part many thousand shaddock trees (*Citrus decumana*) whose flowers were the cause of the fragrance. This fact appeared very curious to me, for although the fruit of the good kind of shaddock is one of the most delicious fruits in

\*Read before the British Association Birmingham meeting.

the tropic, this is only true when the tree is grown in very warm localities, as in the neighborhood of Batavia, situate almost at the level of the sea in about 6° South latitude.

In higher localities like that of Bandoug, where the average temperature is much lower than in Batavia, the fruit of the shaddock has only the size of an ordinary orange, and is not eatable. As the many thousand shaddock trees growing in the neighborhood of Bandoug were therefore almost useless, I thought it interesting to make some experiments on the preparation of the essence of shaddock flowers. This seemed the more interesting to me as I found the shaddock tree growing at an elevation of about 4000 feet, producing an abundance of flowers. The fact that I once collected from one tree in my garden not less than 200 lbs. weight of flowers proves the abundance of flowers that may be obtained under happy circumstances.

I must mention that the wood of the tree is very hard, and acquires a beautiful yellow color; it may also prove to be of some value.

After a great many distillations of several hundred-weights of fresh flowers, the result was that the average quantity of essence yielded by 1000 lbs. weight of fresh flowers was 1 lb.

Having ascertained the amount of product, the following question arises:—Is the essence obtained by me from the *petala* of the shaddock trees identical with the essence of orange flowers called *néroli*? The result of my experiments in this direction was, that the two essences are really identical, which conclusion was afterwards confirmed upon my return to Europe, by the principal manufacturers of perfumes, whom I consulted on this subject, and who declared the essence of shaddock flowers prepared by me to be identical with first rate quality of *néroli*.

Another question of importance also arises:—Would the manufacture of *néroli* in the tropical countries pay? This can only be answered by practical experience. In Java, where I made my experiments, the local circumstances are such that the manufacture would certainly pay.

But besides the *néroli* obtained by distillation of the flowers, there remains in the still after the distillation a substance which deserves attention, if ever my plan of preparing *néroli* in the

tropical colonies should be carried out. If the residue in the still is thrown, yet boiling, upon a cloth, the clear yellowish liquid which passes through the cloth deposits after a few days a large amount of yellow crystals. My experiments with these crystals have proved that they are identical with the substance discovered in 1828 by Lebreton in unripe bitter oranges, and called by him "hesperidine." This hesperidine, which I find very widely spread in the genus *Citrus*, is the pure, bitter substance contained also in orange peels. As this hesperidine is a pure and quite innocent bitter substance, which can be obtained easily, and in tolerably large quantities, from shaddock flowers, it deserves, perhaps, attention as a substitute for hops.—*London Chemical News*, Sept. 29, 1865.

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#### GALE'S NON-EXPLOSIVE GUNPOWDER.

Mr. Gale is repeating his experiments in various places with undoubted success, and the subject is attracting much attention. The secret is now made known by the publication of the patent, and we learn that the incombustibility is produced by mixing one part of gunpowder with three or four parts of finely powdered glass. By the addition of this powder, every grain of gunpowder is isolated, and thus only those grains are ignited which come immediately in contact with the source of heat. Mr. Gale is not the first who has experimented in this direction.

A French and a Russian chemist have both made experiments on the subject. M. Piobert, in 1835, tried a variety of substances, and among them sand. He tried, also, the separate constituents of gunpowder, and, of the three, gave preference to nitre, which he found to deprive gunpowder of its dangerously explosive character. M. Fadeieff, the Russian, preferred a mixture of wood charcoal and graphite, which he found to be unaffected by moisture. Mr. Hearder has lately found almost any dry compact powder will answer the purpose, and states that pipe-clay, gypsum, or chalk do very well. Our readers know that Mr. Gale only proposes that stored gunpowder, and powder for transport, should be treated with his process. When this powder is required for use, the fine glass is separated by

means of a sieve, and the question which is engaging attention is, whether or not the powder is damaged by being submitted to this treatment. One writer suggests that glass powder is liable to become alkaline, and therefore hygroscopic. Mr. Hearder objects that it may not be possible to separate the glass completely, and therefore the explosive force of the powder must be more or less diminished. The *Reader* mentions some experiments which “seem to show that the addition of the protective powder to ordinary powder has the effect of rendering the explosion more gradual”—an effect which would be valuable, if the protective powder were combustible. We have not seen any notice of the effect of the glass on the glazing of the powder, any interference with which would seriously affect the quality of the powder, particularly of the finer kinds. On the whole, we must conclude that the practical value of Mr. Gale’s invention has yet to be demonstrated. It is, indeed, very desirable to have a means of rendering gunpowder combustible or non-combustible, at will; but to be really available, the results must be accomplished with less trouble and risk than is the case with Mr. Gale’s process.—*London Chem. News*, August 18, 1865.

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#### EXPLOSIVE FORCE OF NITRO-GLYCERIN.

Experiments have been made in the open workings of the tin mines of Altenburg, in Saxony, by M. Nabel, which prove that the use of nitro-glycerin, for blasting purposes, is quite practicable. Its chief advantage is, that it requires a much smaller hole or chamber than gunpowder does, the strength of the latter being scarcely one-tenth of the former. If the boring presents fissures, it must first be lined with clay to make it watertight; this done, the nitro-glycerin is poured in, and water after it, which, being the lighter liquid, remains at the top. A fuse is then applied in the usual manner. In one of the experiments referred to, a bore-hole one and one-third inch in diameter was made perpendicularly in a dolomitic rock, sixty feet in length, and at a distance of fourteen feet from its extremity, which was nearly vertical. At a depth of eight feet, a vault, filled with clay, was found, in consequence of which, the bottom of the hole



was tamped, leaving a depth of seven feet. Nearly three pints of the nitro-glycerin was then poured in—it occupied five feet; a match and stopper were then applied, as stated, and the mine sprung. The effect was so enormous as to produce a fissure fifty feet in length, and another of twenty feet. The total effect has not yet been ascertained, because it will require several small blasts to break the blocks that have been partially detached by this.—*London Chem. News*, August 25, 1865.

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### ON EMULSIONS.

BY MR. BARNARD S. PROCTOR.

In our published list of subjects for investigation, my name stands as having undertaken the study of emulsions. At the time this promise was made, I was aware that I could not work it to a satisfactory conclusion in the course of the year, but circumstances soon occurred which made it impossible even to get it so far advanced as to justify a report of progress; unwilling, however, to let the meeting of the Conference for 1865 pass without some communication from myself, I may state to you how the subject arose, and what I had proposed to do.

The subject suggested itself to me, some years ago, from observing that a mixture which was made with balsam of copaiba and an alkali, was, from some cause, a very imperfect emulsion, and that a further addition of alkali rendered it still less satisfactory. At another time I noticed that in making Locock's lotion (from Beasley's formula), a less perfect emulsion was formed, when strong solution of ammonia was used, than when it was prepared with that of .960 sp. gr.; and that it was most perfect when the mixture was so long rubbed in the mortar, that great part of the ammonia evaporated. These were crude and casual observations. I was not prepared to say whether it was much rubbing or much evaporation which was the cause of the superiority in the latter case, but I was impressed with the subject as being one worth looking into. I remembered often observing that soap was much more effectual than caustic alkali, for removing grease from bottles; I bore in mind also, that most, if not all the natural emulsions, were not far removed from neutral-

ity. These floating thoughts, not systematized, but not forgotten, were occasionally turned over, in the hope that they would at last germinate and give rise to a crop of facts which should prove of practical value.

Questions spring up like weeds in uncultivated ground; they are abundant in the field I have entered upon. I propose now to show you the most conspicuous of these spontaneous growths; some time, probably a long time, must elapse, before I can hope to present you with the answers which should be the produce of cultivation.

The first question is, what is an emulsion? Is it essentially a watery fluid, holding in suspension an oily or resinous body? The term is a very indefinite one; all emulsions separate into two parts in the course of time, and we cannot say exactly how slow the separation should be to entitle the mixture to be considered an emulsion. Nor is there any evident reason why other fluids, or fluids and solids, mixing in a similar way, should not be considered emulsions. Milk and chyle may be considered animal emulsions, and the juices of *Taraxacum*, *Chelidonium*, or *Ficus elastica*, may be regarded as natural emulsions from the vegetable kingdom; and we would not wait till we had ascertained the length of time required for the separation of their parts, not till analysis had proved the nature of their proximate constituents, before pronouncing them members of the emulsion family. My first queries were in reference to the state or mechanical nature of the mixture. I asked myself, are the suspended particles always spheroidal? If not, are emulsions more perfect when they are so?

Then a series of chemical questions arose. Do alkalies promote and acids hinder emulsification? Are the naturally emulsible gum resins neutral? Then a group of physical problems, such as the relation between colloid and crystalloid conditions and emulsibility, and the questions, do substances which promote frothing, the mechanical division of air, also promote emulsification, the mechanical division of oil, etc.? These, with many other questions, appeared to occupy an ample field for both inductive and deductive work, in which I had hoped to establish a few interesting principles, and, by the application of these princi-

ples, to lay down a few general rules of practical utility to the pharmacist. I commenced work by experimenting upon simple oils and water, without addition.

Taking an 3iss phial, and putting into it half an ounce distilled water, and 1 drachm olive oil; shaking them together, and noting the kind of mixture and the time required for separation; then adding oil, drachm by drachm,—making the observations till there were 6 drachms of oil to 4 of water. Then commencing again with 4 drachms of oil to one of water, the reverse of the proportions first mixed, repeating the observations, step by step, as water was added, drachm by drachm, up to 4 drachms. Had I been able to devote the requisite time to the subject, I should have made similar experiments with almond oil, castor oil, linseed oil, balsam of copaiba, and other materials, as they suggested themselves, and then proceeded to ascertain the effects of introducing other chemical or mechanical elements into the operation; but the series of observations which thus should have been counted by hundreds, was unexpectedly cut short before it reached the tenth of its expected dimensions, and I have now only to draw your attention to two or three points which already bear some interest.

When olive oil was added to water, the mixture separated most slowly when the proportion was 3 drachms of oil to 4 of water, the time required increasing with each drachm of oil up to this proportion, and again decreasing with further additions, till the proportion was 6 of oil to 4 of water. When water was added to olive oil, the separation takes place much more slowly than in the former case; and, when it had been added drachm by drachm, with agitation at each step, till there were equal parts of each, the separation took place only in several hours, instead of as many minutes, which had sufficed in the former case. And there was no less difference in the mixing than in the separating. In the first series the mixing, as far as the fluids seemed likely to mix, was effected by a few seconds of brisk agitation; but, in the second series, a quarter of an hour's agitation or more was required to effect the mixture of the third and fourth drachm of water, and, when it did take place, the mixture became so thick; that it would not rattle when the bottle was violently shaken.

A careful examination of two mixtures, each containing equal parts of oil and water, but in the one case, the oil being added drachm by drachm to the water, with agitation between each addition, and, in the other, the water being added in like manner to the oil, showed, that in the former, the oil was suspended in the form of globules, the water occupying the interspaces; and, in the latter case, the water was globular, the oil of course occupying the interspaces. As in the ordinary cases of emulsion, the oil is globular, we will, for convenience, call this condition of positive emulsion (+), and when the water is globular, name it a negative emulsion (—). From one or two observations, (+) emulsions mix freely with water, but not with oil, that is, if poured into it, they settle to the bottom as a distinct layer, while a negative emulsion poured into oil diffuses through it, but poured into water refuses to mix; if agitated with a large bulk of water, it separates into globules, but each globule is not a globule of oil, but of (—) emulsion.

Two drops of .960 ammonia being added to  $\frac{1}{2}$  oz. of one of these (—) emulsions caused speedy separation of great part of the water, the oily portion floating like cream on its surface, but did not mix upon agitation; a further addition of ammonia converted the whole into an ordinary emulsion.

I have not yet sought for an agent that would convert a (+) emulsion into a (—) form, though such will probably be found in some lead compounds, judging from a casual observation. The (—) emulsion being so thick, so nearly solid, I put some shot into one of them to facilitate the further mixture of water, which it did in so marked a manner that I judged it not a purely mechanical effect; the more so when I ascertained that fine gravel did not act in a like manner, but each little pebble attracted to its surface a film of water. The shot did not specially attract either water or oil.

2 drachms of oil and 4 of water, being converted into a (—) emulsion by ten minutes' agitation with clean shot, showed scarcely any appearance of separation after standing at rest for four days.

Castor oil and almond oil both showed much less willingness to mix with water in anything like equal proportions, only a small



portion of oil remaining suspended in the water, and a small portion of water in the oil. Balsam of copaiba very readily yielded a negative emulsion when agitated with successive small portions of water till the bulk of water equalled or exceeded that of the balsam; it was a thick creamy yellowish semifluid: the addition of a little solution of potassa made it much whiter and mobile, by converting it into a positive emulsion.

Solution of bicarbonate of magnesia promotes the formation of negative emulsion between water and almond oil; solution of diacetate of lead has the same effect with water and olive oil; the addition of acetic acid to the latter till it had an acid reaction did not alter its character.

Two or three years ago, while experimenting upon the intersolubility of liquids, I observed that strong liq. ammoniæ, agitated with an equal bulk of ether, boils violently. They become viscid and opalescent if agitated in a stoppered bottle, and if the stopper be removed while they are mixed the disengagement of gas throws the fluids out of the bottle; but if allowed to separate under pressure they are not disturbed by the removal of the stopper. From the viscosity of the mixture of two liquids usually so mobile, I conjectured they were in the condition of a negative emulsion.

The relation of emulsibility to intersolubility is a branch of the subject suggestive of interesting speculations.

There is also an interesting group of questions to be investigated, relating to the influence of the relative density of the suspended matter and its medium, the state of division to which the former is reduced, and the viscosity or mobility of the latter and their effects upon emulsification. That density alone is not sufficient to ensure rapid subsidence we have illustrated in the observations recorded by Faraday (on gold in relation to light), in which he found gold in a fine state of division remained suspended in water for months.

I have added one or two observations which bear also upon the mobility of the liquid,—1 grain of heavy carb. magnesia was added to each of the following liquids in tubes of similar size and shape:—water, rectified spirit, ether, chloroform. In the two latter, the magnesia took a somewhat clotty condition, and settled

rapidly, the liquids differing greatly in their density, but both having great mobility. In the two former (water and spirit) the subsidence was much slower, and there was no tendency to clot, the liquids occupying a position between the two former, as regards density, but being inferior to them both as regards mobility.

The experiment was repeated, substituting fine powdered charcoal for magnesia. The subsidence was in all cases slower, but the relation before observed was still maintained. In the water and spirit subsidence was not more complete in twenty-four hours than it was in the chloroform and ether in as many minutes. The charcoal also appeared a little clotted in the chloroform. We may conjecture that the great mobility of chloroform facilitates the action of the agglomeration forces, while its density subtracting from the effect of gravitation allows them time to manifest their action.

The recent experiments of Mr. Crookes, showing how readily mercury may be divided when its surface is tarnished by sulphuretted hydrogen, and how readily it again unites when sodium is supplied to abstract the sulphur, suggests that we should look for a film upon the surface of the globules of emulsified oil, and that materials which cause the separation of the oil, may do so in virtue of a power of dissolving or decomposing this film.

In concluding these observations, let me express a hope that some other members of the Conference will add a few notes to my own. On the list of subjects for investigation it is stated that I will be glad to receive communications upon the subject. I have not received a line from any one. I cannot but think that many gentlemen may have fragments of information which while isolated appear valueless; let me assure all my fellow-members that no observations are too fragmentary or isolated to be thankfully received. To any one engaged in an investigation the most trifling matter is not to be overlooked, and communications always act as an encouragement and stimulant to continued work.

11, Grey Street, Newcastle-on-Tyne, July, 1865.

—*London Pharm. Jour.* Oct. 1, 1865.

## TANNIN IN BRITISH GALLS.

BY WILLIAM JUDD, F.C.S.

Having noticed for some three or four years past the large quantity of galls on the oaks in this neighborhood, the question naturally occurred, Could not these galls be turned to some practical account? When, therefore, this subject was proposed for investigation by the British Pharmaceutical Conference, I gladly undertook to do what I could to set the matter at rest. Great differences of opinion appear to exist as to the value of these galls, and those who have examined them have arrived at very various conclusions. This may have been partly attributable to the different ages of the galls in which the tannin was estimated.

The questions proposed are, "What is the quantity of tannin in English galls (*Cynips Quercus-petiolis*) at different stages of their growth? Can they, at either of these periods, be employed economically as a substitute for the nut-galls of commerce?"

The reply to the second question must obviously depend on the results obtained in investigating the first.

My first aim was to ascertain the most trustworthy and simple process for estimating the quantity of tannin present. The gelatine process being open to many objections, I endeavored to substitute some other. The plan recommended by Mr. Marriage in *Pharmaceutical Journal*, vol. iii. p. 509, with ammonio-sulphate of copper, was inadmissible on account of the dense color of the fluid obtained by percolating or macerating the galls. The gallo-tannates of lead and antimony are said by Miller to be insoluble, and I attempted to found a process on this fact, but without success. These compounds are not so insoluble as stated. Many other plans were tried, but with them all there was some difficulty or obstacle that rendered the process useless. I was obliged, at last, to adopt the gelatine process, modified by the addition of alum, as suggested by Müller.

It is unnecessary to detail all the experiments; suffice it to say, the following results are the mean of several trials, the galls also being exhausted in various ways:—

I. I first examined a sample of old galls, which had hung on the trees till Christmas, of course perforated by the escape of the

fly. They were found to contain an average of 15.97 per cent. of tannin.

II. Galls gathered when mature (in the month of August), not perforated. These were found to contain 17.65 per cent. of tannin.

III. Galls gathered when about half developed and dried, producing a more dense and shrivelled gall. These contained 13.4 per cent. of tannin. It appears from this that the mature galls, gathered before the escape of the fly, contain, as might have been expected, the largest quantity of tannin.

With these data we may turn to the second question, "Can they, at either of these periods, be employed economically as a substitute for the nut-galls of commerce?"

The quantity of tannin contained in Aleppo galls, as stated by various authors, ranges from 30 to 65 per cent., which is obviously much more than that contained in these British galls; yet, with so considerable a percentage of tannin, there are probably some uses to which they may be advantageously applied. I have not yet been able to make any experiments with a view to ascertain if gallic or tannic acids may be commercially prepared from them. I will, however, if deemed desirable, take up that point and report thereon at the next meeting of the Conference.

One purpose for which these galls may undoubtedly be used is that of dyeing; and as large quantities of Aleppo galls are constantly in demand for this purpose, British galls would here find one of their most important applications. Another use would be in making ink. I have made some ink from a formula known as Wollaston's, using the same weight of British as Aleppo galls. The product is a fair average ink, with which this paper is written. I used the old perforated galls; had I used a larger quantity of these, or used some of the mature galls, it would probably have made a better ink. No other tannin-yielding material was added. They might also be used for some kinds of tanning Oak-bark, according to Davy, yields from 5 to 7 per cent. of tannin, with which these galls stand in favorable comparison, and they might, in some cases, be advantageously substituted.

The quantity of these galls in some districts is very considerable, and their collection in quantity would be easy.



In conclusion, I may advert to a peculiarity I am unable to explain, which is the dense color of an aqueous solution of the galls, the galls themselves being light in color and very porous in texture.

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Dr. ATTFIELD said he had just received a letter from Dr. Wilmot, of Tunbridge Wells, confirmatory of Mr. Judd's results. From a rough examination Dr. Wilmot had found a large quantity of tannin could be obtained from English galls, but that they must be gathered at a particular period of growth. He hoped that if we were to suffer from a pest which was certainly on the increase, some good might be derived from it, and some check in its advance be furnished by the very means whereby that good was to be obtained.

—*London Pharm. Jour.* Oct. 1, 1865.

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#### ON ITALIAN CASTOR OIL.

Dr. Attfield stated that Mr. Henry Groves, of Florence, was engaged in ascertaining for the Conference the cause of the absence in Italian castor oil of that unpleasant taste characteristic of the chief commercial varieties of that well-known medicine, and would probably send a paper on the subject to the next meeting in 1866. Meanwhile, a recent pupil, Mr. Phillips, now of Naples, had sent him some remarks on the matter, which might be read at the present meeting, and would thus probably aid Mr. Groves in his investigation. Mr. Phillip's letter was as follows:—

14, *Strada S. Carlo, Naples.*

Dear Sir,—Seeing that the question No. 131 had been accepted by Mr. H. Groves, I thought it unnecessary to trouble you with any further remarks on the subject, nevertheless it has occurred to me, even at this late moment, that my promise ought to be kept, although I can but offer but little information on the subject in question.

The castor-oil plant here attains a height of from 10 to 16 feet, and is generally biennial, sometimes triennial; the seeds, which are ripe in the middle of autumn, are generally smaller than the East Indian, some are of a uniform dark color, others very prettily streaked.

The oil is generally prepared during the following summer, the warmth of the weather causing a more abundant yield of oil.

The outer skin is removed by cracking the seeds with a hammer on a marble slab, which operation is performed by women, the skins being blown away by a kind of fan ; they are then placed in the press which is lined with filtering-paper, pressure is applied very gently, and extends over several days, the oil is again filtered as it runs from the press, and is set aside that any little fecula still remaining may deposit. Exposure to the sun is always avoided, from its tendency to produce rancidity. This oil is of a very pale color, nearly odorless, and possesses hardly any taste. Unfortunately, the wholesale price of this oil is the same as the retail price of much that is sold in England, therefore very little can find its way into the English market.

The variety of Italian castor oil prepared for exportation is made at all seasons of the year ; very little care is taken in decorticating the seeds, which are triturated between stones into a paste before pressing, and steam heat applied during the process. Frequently they are beaten with the skins into a paste, and the oil then filtered through paper or flannel after having been mixed with animal charcoal, the filtering being conducted in a heated room.

I have learnt from good authority that large quantities of East Indian seeds are imported into Italy, and furnish much of the oil exported from this country.

The oil last mentioned has a much stronger odor, and more acrid taste, and is also more colored than the first ; but is less disagreeable (when from Italian seeds) than the Indian or American oils. With regard to the real question, as to the cause of the less nauseous taste of the "Italian Oil," I can only ascribe it to the fact of the oil being prepared from fresh seeds, well decorticated, often not bruised, and without heat. The oil obtained from seeds three or four years old has a much stronger odor and taste, in fact the oil keeps sweet much longer when expressed than in the seeds.

The variety exported, if prepared from fresh seeds and without much heat, enjoys to some extent the same properties, and is more active than the finest variety.

The seeds themselves are sometimes used as a purgative, two seeds grated and taken in water having the same effect as an ounce of oil.

The oil is often taken in the form of an emulsion. 1 oz. with 1 oz. of syrup, and  $\frac{1}{4}$  oz. powdered gum, are well mixed in a dry mortar, stirring always in the same direction. When it becomes sticky, a little peppermint or orange-flower water is added, and 4 oz. distilled water gradually stirred in. This forms a most elegant emulsion, with scarcely the slightest taste of the oil; it is called here, "Olio di Ricini a l'Inglese."

I fear that little service will be rendered to the Conference by this very imperfect description of the Italian process for obtaining the oil, and must apologize for my neglect in not writing sooner. If at any time I can furnish you with any information respecting the processes here employed in the production of pharmaceutical products, I shall be most happy to do so.

With much respect, believe me, dear Sir, yours truly,

JOHN PHILLIPS.

—*London Pharm. Jour.* Oct. 1, 1865.

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#### TEST FOR OTTO OF ROSES.

Hager mixes five drops of the otto to be tested with twenty drops of pure concentrated sulphuric acid. Whether the oil be adulterated or not, a thick yellowish brown or reddish brown mixture results. When this mixture is cold, it is shaken up with three drachms of absolute alcohol. If now the otto is pure, a tolerably clear yellowish brown solution results, which, after heating to boiling, remains clear. But if the otto is adulterated with geranium, palm rose, or pelargonium oil, the solution remains very cloudy, and in some cases a darker fluid separates, in which a deposit forms. On heating this solution, the sediment melts together, and from the size of the mass the author infers the degree of adulteration. If, for example, the mass has one-fourth the volume of a drop, he concludes that the otto was mixed with at least one-third of foreign oil. If the otto is adulterated with spermaceti, this substance separates and floats on the surface of the solution, or remains suspended in the liquid as a scaly crystalline mass. The above test is founded on the circumstance that pure otto of rose forms, with strong sulphuric acid, a resinous substance, which is completely soluble in absolute

alcohol; while the substance formed with other oils is only partially soluble. Guibourt has observed that the odor of pure otto is not affected by mixture with strong sulphuric acid, but if other oils are present a disagreeable odor is developed.—*Chem. News*, Oct. 13, 1865, from *Zeitscht. für Analyt. Chem.*, No. 4, 1864, p. 479.

### Abstract of the Minutes of the Philadelphia College of Pharmacy.

The semi-annual meeting of the Philadelphia College of Pharmacy was held at the College hall, September 25th, 1865.

The Minutes of the last meeting were read and adopted. The minutes of the Board of Trustees were read by the Secretary.

The delegates to the late meeting of the American Pharmaceutical Association, which assembled in Boston, reported that several interesting sessions of the Association were held, and a cordial welcome extended to the delegates and strangers in attendance by the Boston members.

The semi-annual election being ordered, Wm. C. Bakes and S. N. James, acting as tellers, reported the election as

#### *Trustees.*

Dr. W. H. Pile,	Edward Parrish,
A. B. Taylor,	Evan T. Ellis,
Wm. C. Bakes,	Wm. J. Jenks,
H. N. Rittenhouse.	Chas. Shivers.

#### *Committee on Deceased Members.*

Edward Parrish, William Procter, Jr., Charles Bullock.

The Chair announced the decease of Algernon S. Roberts, one of the original members of the College.

A copy of the certificate of the Massachusetts College of Pharmacy was presented to the College. On motion, the Secretary was directed to forward to the Massachusetts College of Pharmacy a blank copy of the diploma and certificate of membership of this College.

On motion, then adjourned.

CHARLES BULLOCK, *Secretary.*

### Varieties.

*American Sienna.*—A valuable repository of this precious pigment exists in the town of Whately, which will soon be reported upon, and is destined to be brought into extensive use.—*Amer. Jour. of Science and Arts*, July, 1865.



*The Production of Organisms in closed vessels.*—As appears from an abstract in the *Reader* of May 20, a paper by GEORGE CHILD, M.D., in continuation of a former communication, was read before the Royal Society, April 27. Dr. Child's experiments were similar to the earlier ones of Prof. Wyman, and reach the same results, viz., that Bacterians are produced "exactly under the circumstances in which M. Pasteur asserts that they do not exist." And he accounts for the discrepancy thus: "M. Pasteur, in his memoir, speaks of examining his substances with a power of 350 diameters. Now my experience throughout has been, that it is impossible to recognize these minute objects, with any degree of certainty, even with double that magnifying power. When once their existence on a slide is shown with a power of 1500 to 1700 diameters, it is quite possible afterward to recognize the same object with a power of 750," &c. He continues: "I can now have no doubt of the fact that 'bacterians' can be produced in hermetically sealed vessels, containing an infusion of organic matter, whether animal or vegetable, though supplied only with air passed through a red-hot tube, with all necessary precautions for ensuring the thorough heating of every portion of it, and though the infusion itself be thoroughly boiled. . . . "It seems clear that either (1) the germs of Bacterium are capable of resisting the boiling temperature in a fluid, or (2) that they are spontaneously generated, or (3) that they are not 'organisms' at all. I was myself somewhat inclined to the latter belief concerning them at one time; but some researches in which I am now engaged have gone far to convince me that they are really minute vegetable forms. The choice, therefore, seems to remain between the other two conclusions. Upon these I will not venture a positive opinion, but remark only, that if it be true that 'germs' can resist the boiling temperature in fluid, then both parties in the controversy are working upon a false principle, and neither M. Pouchet nor M. Pasteur is likely at present to solve the problem of spontaneous generation." The decided conclusion as to the organic character of these Bacteriums was reached through an examination of them by the  $\frac{1}{50}$  object-glass recently constructed by Messrs. Powell and Lealand.—*Amer. Jour. of Science and Arts*, July, 1865.

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## Editorial Department.

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MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.—In order to give a full account of the proceedings of the late meeting at Boston, we have printed an additional form. Through the courtesy of Prof. Maisch, the permanent Secretary, we have been able to extend greatly our own notes by an inspection of the stenographic report of the proceedings. It has become a sort of law that scientific papers read at the Association shall only reach the journals through the official proceedings, and hence

we have not been able to offer any of them to our readers. The printing of the discussion on the subject of alcohol in connection with the internal revenue tax is nearly in full detail, and will be interesting to many. The spirit with which the sessions were animated, the full attendance, and the large number of new members, all rendered it one of the most successful gatherings that have taken place, and fully repaid the time and expense of getting there. The members of the Massachusetts College of Pharmacy were unremitting in their exertions to add interest to the occasion, by well-timed movements outside of the meetings. On the evening of the first day, an impromptu visit of the Boston members and their wives, to the visiting members of the Association and their wives, at the Tremont House, was admirably managed; breaking the ice of reserve, and rendering the members better acquainted than a whole series of sessions would have accomplished. In the midst of the pleasant intercourse, it was announced that the authorities of the hotel required the parlor vacated, when the company, following a worthy Ex-President, soon found themselves in an apartment, wherein a table spread with many delicacies invited them to partake of its bounty.

The ladies were well cared for during the sessions of the meeting, and, through the agency of Mr. William Brown and some of the Boston ladies, visited numerous places of interest in Boston and its vicinity, so that the time passed agreeably and rapidly. Not satisfied with this, on Thursday afternoon the whole Association adjourned to meet on a steamer at India Wharf, with the flag of the Massachusetts College of Pharmacy at the bow, and proceeded down the harbor into Massachusetts Bay, among the forts and islands, calling at Nahant for a short visit at that noted watering place, and debarking at Point Shirley, to partake, at Taft's Hotel, of a regular fish supper, in true Boston style. More than two hundred sat down to the repast, whilst the band accompanying the excursion discoursed sweet music. Many strangers had an opportunity of partaking, for the first time, of a real Yankee *chowder*, of approved quality, as a preliminary, and pronounced it good; when other, and numerous delicacies, of fish, flesh, fowl and fruit, vied with each other in tempting the appetite. The party re-embarked at 8 o'clock, and, after a most delightful moonlight excursion to Fort Warren and along the harbor, returned to the city, much gratified with their experience of Boston hospitality and attentions.

We must not forget to notice a visit to the great organ at Music Hall, planned by the Committee of Arrangements, where, for a full hour, this extraordinary instrument poured forth its wealth of sounds with a magnificence of compass, depth, and sweetness intensely gratifying to the visitors, most of whom had not heard it before.

Such are a few of the episodes of the meeting, which, all in all, will long be remembered as the best attended, most animated, and most harmonious of the annual gatherings of the Association.

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**THE BRITISH PHARMACEUTICAL CONFERENCE.**—This body commenced its annual meeting on Tuesday, Sept. 5th, 1865, at Odd Fellows' Hall, Birmingham, England, Mr. Henry Deane, President. About seventy members were present, including many of the most prominent pharmacutists of England. One hundred and eight new members were elected at the first sitting. The report of the Executive Committee was then read by Dr. Attfield, followed by President Deane's Address, which is a document of considerable interest and spirit. The reading of papers then commenced. Of these about thirty were read during the several sittings, and after each paper a discussion of its merits, or remarks in reference to it, were made, a feature to some extent adopted in our own Association. The Editors of the *Pharmaceutical Journal* for October 1st have published the proceedings in full, by issuing a double number, 82 pages of which are thus occupied. Two or three of these papers are included in the present number of this *Journal*. On Friday evening, Sept. 8th, a *Conversazione* was held at Odd Fellows Hall, followed by a supper. At the final sitting of the Conference, held Sept. 12th, officers were elected for the ensuing year. These are, Prof. Bentley of the Pharmaceutical Society, President; Mr. Deane, Mr. Edwards of Liverpool, Mr. Hanbury, Mr. Parr of Nottingham, and Mr. Stoddard of Bristol, as Vice Presidents. Dr. Attfield continues Secretary, assisted by Mr. Reynolds of Leeds.

The meeting was considered to be highly successful, and adjourned to meet in Nottingham in September, 1866.

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**MEETINGS OF PHARMACEUTICAL ASSOCIATIONS IN GERMANY.**—The meeting of the Allgem. Oesterr. Apotheker Verein (General Austrian Apothecaries' Association,) was held at Graz. During the different sessions seventy-five members were present. On the evening of the 15th of August, the majority were present at a social entertainment. The sessions commenced at 10 o'clock on the 16th, with the usual annual reports; afterwards, the creation of a general Austrian Apothecaries' Pension Fund was resolved upon, and the Constitution for the same considered. At two o'clock the Association, with many ladies, sat down to a festive dinner. On the 18th the Association, accompanied by their ladies, made an excursion to rolling works, glass factories, and coal mines in the neighborhood. The last session took place on the 19th; a library and a collection of drugs and preparations was established, and a pharmaceutical laboratory, to be established in Vienna, resolved upon. Delegates were elected for the meeting of the General German Apothecaries' Association, at Brunswick, and the International Pharmaceutical Congress. Discourses were delivered on several interesting subjects, among which we enumerate one on drugs from tropical countries, by Mr. Dietrich, of Prague; on Castor, by Mr. Tucks, of Vienna; and, by Dr. Ledlitzki, of Vienna, on a colony of castors kept by Prince Schwarzenberg, in Bohemia.

The specimens exhibited consisted, among others, of all varieties of

Cinchona bark, different kinds of rhubarb, the rarer kinds of jalap, of rare illustrated works on Natural History, of microscopical specimens, of chemical and pharmaceutical apparatus, &c. The Association, which has been in existence only four or five years, consists of 608 members, and has in the Treasury the sum of 6140 guilders (\$2947.)

The Committee of the North German Apothecaries' Association has published the following programme of the annual meeting, which was to be held at Brunswick :

Monday, Sept. 11th.—Reporting of members to receive their cards ; in the evening social entertainment.

Tuesday, Sept. 12th.—9 o'clock, A. M., general meeting ; 2 P. M., festive dinner ; evening, concert.

Wednesday, Sept. 13th.—8 o'clock, A. M., conference of the directors ; 10 o'clock, general meeting ; 2 P. M., dinner ; evening, theatre.

Thursday, Sept. 14th.—Excursion to Harzburg.

Friday, Sept. 15th.—Commencement of the International Congress of the deputies of the different Pharmaceutical Associations.

*Materia Medica, for the use of Students.* By John B. Biddle, M. D., Prof. of Materia Medica in Jefferson Medical College, &c. With illustrations. Philadelphia, Lindsay & Blakiston, 1865, pp. 359, octavo.

This work, which originally appeared as a "Review of Materia Medica," has, in this new edition, been enlarged and the title changed. It has been adapted to the new Pharmacopœia, and many of the articles have been rewritten. It is intended as a guide book to the course of lectures delivered by the Author at the Jefferson Medical College, and, without taking the place of the Dispensatory, will be found to be a good text book to the student who desires to closely follow his teacher. The work is well arranged, well printed, and carefully corrected. Had the space allowed it would have been well to include notices of a larger number of our extensive indigenous plants, very many of which are noticed and figured.

*Stimulants and Narcotics, their mutual relations ; with special researches on the action of Alcohol, Ether, and Chloroform on the vital organism.* By Francis E. Anstie, M. D., M. R. C. P., Assistant Physician to Westminster Hospital, lecturer on Materia Medica, &c. Philadelphia, Lindsay & Blakiston, 1865, pp. 414.

It is not much to say that this book has involved a very large amount of thought and experimental investigation, indicating a thoroughness which places it along side of Headland and other similar books. The author says, "in order that we may start fairly in the inquiry which is before us, let us understand what are the acknowledged elements of the problem to be solved. They are simply the existence of two classes of physiological agents, respectively known as Stimulants and Narcotics (or Sedatives),



and of an intermediate class, known as Narcotic Stimulants (or in looser phraseology, as Narcotics), all three classes acting upon the nervous system; the stimulants having the power of exciting its action; the sedatives of depressing the same; and the narcotics, or narcotic stimulants of producing both kinds of effect. It is to the latter class, as forming the meeting point of the two kinds of physiological action that our closest attention will be required, and it is to this class that the three substances which have been chosen for detailed investigation belong; as do also tea, coffee, tobacco, and the whole genus of soothing, 'care breaking' luxuries (to use an expression of Von Bibra's) so freely used in every day life. All these classes act upon the nervous system, either directly, as when the nerves affected lie close beneath the skin or mucous membrane to which the agent is applied, or indirectly, as is more usually the case, by being absorbed into the blood, and carried by the circulation to all parts of the nervous apparatus."

The author considers so much agreed, but believes that difficulties begin when it is undertaken to show what effects are referable to stimulation and what are not. He gives a history of the doctrine of stimulus—followed by criticism, and in a long chapter discusses a reconstruction of the doctrine from the stand point of modern physiology, which he believes will greatly modify the doctrine from its present aspect. He then defines narcosis and discusses its doctrines and facts and draws his conclusions. The work then closes with his experimental researches on the three agents, ether, chloroform and alcohol, entering very freely into the subject, from a practical familiarity with it, due to his having for a series of years been in the habit of producing anæsthesia to the extent of several thousands of cases in which records were kept. We have not space to give the notice this book deserves, it is full of interest even to the general reader, but to the physician its views and results appeal for a careful study to see how far they throw light on his own practice and to what extent the reasoning will modify his views of the phenomena of life and disease. We shall look with interest in the pages of our medical cotemporaries for an earnest review of Dr. Anstie's work in the spirit of true progressive medical philosophy. The publishers have done their part well, and in point of execution and paper it is all that need be desired.

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*The Physician's Visiting List, Diary, and Book of Engagements, for 1866.*  
Philadelphia, Lindsay & Blakiston.

Our medical friends are reminded that this little annual is again ready to yield its useful fruits of order and satisfaction to the practitioner who may engage its services; and we might say who, now, does not avail himself of this or some other similar work, to make punctuality the rule, and save hundreds of dollars annually by the certainty of recording visits? It is found of two sizes, for 25 and 50 patients and in pocket-book form with pencil ready for immediate use.























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